

<https://helda.helsinki.fi>

pö A Kuznets rise and a Piketty fall : income inequ

Roikonen, Petri Juhani

2020-02

Roikonen , P J & Heikkinen , S 2020 , ' A Kuznets rise and a Piketty fall : income inequality
pö in Finland, 1865 1934 ' , European Review of Economic History , vol. 2

<http://hdl.handle.net/10138/323580>
<https://doi.org/10.1093/ereh/hey032>

unspecified
acceptedVersion

Downloaded from Helda, University of Helsinki institutional repository.

This is an electronic reprint of the original article.

This reprint may differ from the original in pagination and typographic detail.

Please cite the original version.

A Kuznets Rise and a Piketty Fall?

Income Inequality in Finland, 1865–1934

PETRI ROIKONEN AND SAKARI HEIKKINEN

Economic and Social History, Faculty of Social Sciences, University of Helsinki, Finland.

petri.roikonen@helsinki.fi, sakari.heikkinen@helsinki.fi

This study presents the new Gini coefficient and top income share series for Finland in the years 1865–1934 by utilizing Finnish tax statistics, which provide data on a poor country on the threshold of modern economic growth. Income inequality was relatively moderate in 1865, while famine (1867–68) decreased it further. Income inequality increased substantially during the late nineteenth century, then declined during WWI and its aftermath, followed by another increase in inequality in the late 1920s that was halted by the Great Depression. The rising level of inequality before WWI fits well with the ideas of the Kuznets curve and maximum inequality, whereas the decline in inequality was due to shocks (e.g. civil war).

1. Introduction

Recent research on the long-term developments in income inequality has led to lively discussions on the relationship between inequality and economic history.¹ However,

because of a lack of data, much of the research has focused on the twentieth century, especially the latter half of it. Although many studies use different sources for long-run inequality measures (e.g., Milanovic 2016; Milanovic et al. 2011), the lack of a homogenous long-run series remains problematic. This study contributes to this discussion by exploring the case of Finland between 1865 and 1934. Finland is an interesting case study since it was a non-industrialized, poor country, but, relative to that, introduced an income tax at a noticeably early point in time: 1865 (OSF 2017; Hjerppe 1989). Since most existing long-term studies focus on countries that had already surpassed Finland's income level in the 1860s at a much earlier point in time, Finnish tax data from the 1860s onwards is of empirical historical interest beyond just a particular study of national development. Furthermore, theories regarding the determinants of inequality are discussed here in light of such relatively modern tax data for a poor developing country. The Finnish case will make an interesting contribution to discussions of the Kuznets curve (Kuznets 1955), the role of economic and political shocks (e.g., Piketty 2014), and the inequality possibility frontier (Milanovic et al. 2011; Milanovic 2016).

Thus far, Finnish research on income inequality has focused on the period from the 1960s to the present.² However, a few studies have investigated it prior to the 1960s. For instance, Jäntti et al. (2006 and 2010) have described the development of Finnish income inequality beginning in 1920, and Hjerppe and Lefgren (1974) have, in their pioneering study, examined income inequality from as far back as 1880. In addition, Roine and Waldenström (2015) have made rough estimates of the top income shares in 1865, 1871, 1876, and 1880. Moreover, several local studies on income inequality exist for rural areas (e.g.,

Nummela 1990) and cities (Renvall 1900; Nummela 1987). However, the larger picture of income inequality for the years 1865–1934 has remained unclear, since these prior studies cannot be compared with one another and only cover sub-periods or specific regions. In this study, we construct a consistent series on inequality following the common methodology used already by Kuznets (1955) and revisited and elaborated upon in recent decades by Piketty (2001, 2003), Piketty and Saez (2003), and Blanchet et al. (2017).³

This study presents the new homogenous income inequality series for Finland for the years 1865–1934 based on income tax data. The starting point for the period, determined by the introduction of the first state income tax (Wikström 1985), coincides with the period of the Great Famine of 1867–68 (Häkkinen and Peltola 2005). It is followed by the early decades of economic growth, which lasted until the economic and political shocks of WWI and the Finnish Civil War (1918). The final year of the study is 1934, when Finland had recovered from the huge economic shocks of WWI and its aftermath, had experienced rapid growth in the 1920s, and was in the midst of dealing with the Great Depression of the 1930s. The new income tax introduced in 1920 had already been fully implemented, and it remained basically the same until the changes made in the middle of the 1930s, when the tax unit was changed from that of a household to that of a person (Jäntti et. al 2010). In addition, the share of the taxed population declined from roughly two thirds to roughly one sixth of the adult population. Therefore, the choice of the research period is dictated partly by the data but also by the characteristics of the Finnish economy, that is to say, of it not yet being the Nordic welfare society that it developed into after WWII.

The seven decades studied can be divided into three main phases: 1) an agrarian society with stagnant mean incomes until the 1870s; 2) a poor society with rising mean incomes between 1870 and 1914; and, 3) the time of the twin crises of WWI and the Great Depression during the years 1914–34. This study describes economic inequality and discusses its drivers in several different ways: top income shares, Gini coefficients, and Williamson indexes. The Finnish time series was compared with equivalent series from Sweden, Norway, Denmark, the United States, Great Britain, France, Germany, and the Netherlands. Lengthy and reasonably reliable time series exist for each of these countries, although the amount of available data is sparse for the nineteenth century.⁴ Since recent developments in income inequality differ greatly in these countries, it is interesting to compare supposedly “egalitarian” Finland with other Nordic, Anglo-Saxon, and Central European countries. In addition, Finland is an interesting comparison case because the long-rung income inequality series have thus far described inequality in economies on the frontier of economic growth.

The results of this study indicate that income inequality was relatively moderate in poor agrarian Finland in the years 1865–80 compared with other countries, although the top income shares were just as high, while famine (1867–68) reduced it further. However, inequality was still high compared to modern times. During the late nineteenth century, income inequality increased substantially, reaching a higher level than in many other countries. It then drastically declined between 1914 and 1924. The Finnish economy rapidly recovered from the shocks in the 1920s, which once again introduced the trend of income

inequality. However, the Great Depression halted the increasing inequality, and the income differences never again reached anywhere near the levels of the early 1920s.

The rising inequality levels during the early phase of modern economic growth (from the 1870s to WWI) fit well with the scheme captured by the Kuznets curve as well as the maximum inequality hypotheses, but the period of decline cannot be interpreted as the result of normal economic progress, since it was mainly caused by economic and political shocks, the importance of which Piketty (2014, 2015, 2017) and Scheidel (2017) in particular has emphasized.

The article is organized as follows. In sections 2 and 3, we describe the data and the methods used. In section 4, we describe the phases of income inequality in Finland between 1865 and 1934. Thereafter, in section 5 we discuss the factors behind the changing inequality levels and gauge the aptness of the explanations suggested in the extant literature. We also compare Finland with several other countries. In section 6, we offer some concluding remarks.

2. Data

An "ideal" dataset for studying income inequality would consist of data on incomes of all kinds at the individual level. This would make it possible to use the different income concepts: factor income, gross income (= factor income + transfers received), and disposable income (= gross income – taxes paid). Income tax data, which are the main sources of income used for this study, however, are in many respects less than ideal. The data consists of three

tax regimes: 1) the first state income taxes from 1865, 1871, 1876, and 1880; 2) municipal taxes from 1898, 1899, and 1904; and, 3) the “new” income and property taxes from 1920–22, 1924, 1926, 1929, 1931, and 1934. In addition, we have collected micro data from “the high income taxation” of 1916, which accounts for approximately 0.8% of the top income earners in the total population. Tax units were tabulated on income brackets for all of the tax statistics (see appendix table A2).⁵ The average incomes for the tabulated income brackets were available only for 1880 and 1898–99 and from 1920 onwards.⁶ The main sources were supplemented with data on municipal taxation from the four largest cities (Helsinki, Turku, Tampere, and Viipuri) from 1875 to 1899,⁷ statistics on municipal taxation in Helsinki for 1880, 1900–04, and 1906–28,⁸ and an income survey of six rural municipalities (Tuusula, Humppila, Vihanti, Kymi, Räisälä, and Vihanti) from 1903.⁹ The international comparisons rely especially on The World Inequality Database (WID).

For all these years, a household—not an individual—was the tax unit. In the nineteenth and early twentieth centuries, taxes were imposed on “the head of the household,” which in most cases was a man (Fougstedt 1948, pp. 254). Thus, the tax unit can be comprehended as a household or a family.¹⁰ However, the unknown composition of households makes it impossible to distinguish between differing types and sizes of tax units.¹¹ The estimates of the number of non-taxed households are based on the number of taxed households and the number of total households derived from official demographic statistics, which in turn are based on church registers and censuses in the largest cities and

considered quite reliable. Yet, there are no ready-made consistent series on the number of households; hence, we made a few estimations.

Our anchoring point is the number of households (454,339) reported in the population statistics from 1880. The same information is also available in the population statistics for 1890 and 1900. The number of households (281,253) reported in the 1865 population statistics cannot, on the other hand, be compared with the 1880–1900 figures because laborers were counted as members of a master's household. The practice ended only during the 1870s, when the legislation concerning wage labor was changed.¹² However, with state income taxation (1865–85) the tax unit was the household in the latter, modern sense. In municipal taxation records, rural laborers were treated as separate tax units only from the 1890s onwards.¹³ To also capture laborers' families as households and potential tax units before 1880, and contrary to the way in which population statistics were classified at the time, we have estimated the number of on the basis of the average size of households relative to the population for the years 1880–1900. The time series were extended backwards using information about married men and widows for the years 1865–1900. Hence, our estimates for 1865 revealed 428,782 households, which is more than 50% higher than the number found using the population statistics. From 1900 to 1926, we have calculated the number of households by linking them to the data on population statistics from 1930 (based on church registers) and using the actual censuses from the larger cities from the previous half century (1880, 1890, 1900, 1910, 1920, and 1930) as supplementary data. Finally,

estimates of the average size of households were used to calculate the overall number of households.

The share of those persons being taxed rose from one fifth to one third between 1865 and 1880 (state income tax), to more than two thirds in 1898–99 (municipal tax) and 1921–34 (state income tax).¹⁴ This was due to the practically unchanged tax threshold in the time of economic growth.

The income concept was taxable income, which varied to some extent between the various tax systems. The stipulations of the state income tax legislation (1865–85) formed the essential foundation for the statutes on municipal taxation in various cities (1882–) and in rural areas (1898–) (Hjelt and Broms 1904, pp. 1–11; Hjelt and Broms 1905, pp. 1–5). Income consisted of any income derived from labor, capital, business and trade, in other words, market or factor income, of which the direct taxes and fees paid to the state, the church, or the municipality were deduced when defining taxable income.¹⁵ Thus, the concept of income comes nearer to that of disposable income. However, all three income concepts (factor, gross, and disposable incomes) were relatively closely aligned in the nineteenth century and at the beginning of the twentieth century as a consequence of minimal social transfers and low direct taxes in the era prior to the welfare state, although in the 1920s income taxes increased.¹⁶

Companies were taxed as taxable units, which made it impossible to separate them from households between the years 1865 and 1880. Only the dividends were taxed in 1865, 1871, and 1876, whereas companies were taxed based on their profit in 1880. No state double taxation occurred during the years 1865–85, since persons receiving dividends never paid

taxes on incomes from companies, which were already taxed. However, since state income taxation (1865–80) included companies as tax units (the amount of dividends paid) and had fewer exemptions with respect to property-related incomes, the reported incomes of high-income groups were probably lower in terms of municipal taxation than state income taxation (1865–80).¹⁷ After 1920, the difference with respect to previous income taxes was that the paid taxes or fees were no longer deducted from incomes and some social transfers were added, so that the income concept was closer to that of gross income compared with earlier tax statistics (Jäntti et al. 2010).¹⁸

Table 1. (Here)

The tax statistics utilized in this study are not, thus, totally comparable and “ideal” (see table 1). However, the main rationale for using these differing income tax statistics is simply that they are the only available source for measuring overall income differences in Finland between 1865 and 1934. Although the slight heterogeneity of the data causes some problems (discussed in detail in appendix B), we believe that these sources are sufficiently comparable for inclusion in this study. Finally, international studies on long-term income inequalities struggle with similar problems. Furthermore, these defects in the data need to be recognized, and especially time series from different countries should be compared with caution (Atkinson et al. 2010).

3. Methods

3.1. Estimating the Missing Incomes

One of the most crucial problems when using tax data to study inequality has to do with estimating the incomes of non-taxed households. Previous studies have used two alternative methods to estimate the total incomes of households: 1) as a percentage of GDP (e.g., Roine and Waldenström 2008); or, 2) by estimating the incomes of the non-taxed households using other relevant data (e.g., Aaberge et al. 2016). This study utilizes the latter method because of the relevant complementary data; moreover, the total incomes of the household sector are difficult to capture from the national accounts. First, the study applied the survey to five rural municipalities, which reported incomes for 1903 (Gylling 1907, 1906). The average income of non-taxed households in those particular municipalities added up to 75% of the lowest boundary for paid income tax. It is also notable that the income concept was the same as that of income taxation.¹⁹ The second reference point derives from the senior tax official's estimate for 1880: the average income of non-taxed households was, according to it, 72% of the lowest tax boundary.²⁰ Thus, for the state income tax statistics (1865–85) we have set the mean for non-taxed households at 72% of the lowest tax boundary. Furthermore, from 1898 onwards we used 75% as the reference point.²¹ For the micro data derived from the top income tax rolls in 1916, we set the total income of households at the same percentile of GDP (56%) as in 1898–99, since the top income tax was based on municipal taxation (see calculations using different assumptions in appendix B2).²²

3.2. Estimates from Tabulated Tax Data

This paper follows the common methodology by utilizing income bracket data to estimate inequality used already by Kuznets (1955), which in recent decades has been revisited and elaborated upon by, for example, Piketty (2001, 2003), Piketty and Saez (2003), and Blanchet et al. (2017). This study used relative inequality measures, such as the Gini coefficient²³ and the top income shares, which are unaffected by changes in average incomes and, thus, are quite useful for studies that extend far back into history.

First, a synthesized sample of observations was created using the nonparametric method (WID),²⁴ as introduced by Blanchet et al. (2017).²⁵ The method reconstructs individual income observations based on grouped distributional data, which in turn is based on the inverted Pareto coefficients $[b(p)]$, where $b(p)$ is the ratio between average income above rank p and the p -th quantile $Q(p)$. The WID method uses interpolation techniques by piecewise fifth-degree polynomials defined at each interval $[x_k, x_{k+1}]$.²⁶ This type of approach has proven more accurate than other widely used methods, especially if the number of income brackets is small.²⁷

$$b(p) = \frac{E\{X|X > Q(p)\}}{Q(p)}, \text{ where } 0 < p < 1 \quad (1)$$

Unfortunately, information about average incomes in the various income brackets for 1865, 1871, 1876, and 1904 is missing.²⁸ We solved this problem by using the same average incomes in the income brackets for 1865, 1871, 1876, and 1880, which means that the changes in income inequality, in this case between 1865 and 1880, were caused by moving the tax

units between income brackets. However, these averages cannot be used for 1904, where the income brackets differ.²⁹

Therefore, we used the “robust Pareto midpoint estimator method” (RPME), which utilizes the Pareto distributions; these estimates can be considered a control series (Hippel et al. 2016). This is because we calculated the Gini coefficients using only information about the minimum and maximum thresholds in the income brackets and the number of tax units included at that particular interval for all the years in question.³⁰ In practice, we assumed that the average income in a particular bracket was the middle of the bracket’s maximum and minimum thresholds. For the top income bracket with no upper bound, a midpoint cannot be estimated in this way; thus, the harmonic averages and Pareto coefficients were used instead.

4. The Phases of Finnish Income Inequality, 1865–1934

Figure 1 summarizes the development of income inequality in Finland during the years 1865–1934. The Gini coefficients calculated using the WID method and the control series (RPME) were reasonably close to one another and share a common trend. The results can be divided into three sub-periods. First, income inequality decreased in the 1860s, but by the end of the 1870s it had risen above the previous level.³¹ Second, beginning in the 1870s income inequality increased substantially until the early 20th century. Third, the Gini coefficients dropped considerably between 1905 and 1924, roughly to the same level as in the 1870s and 1880s.³² Income differences recovered during the latter half of the 1920s; however, inequality slightly decreased between the years 1931 and 1934. In addition, the

top 0.5 percent's share of total household incomes followed the same pattern, but with one exception: the top income earners' share dropped drastically during the research period.

Figure 1. (Here)

This raises the question of whether assumptions about the incomes of the non-taxed households or the quality difference in the data played a crucial role in the estimations. Yet, even after massive changes in the assumptions, the overall picture remained unchanged (see appendix B2 for the calculations). The results were most volatile between 1865 and 1880, when decreasing the average income of the non-taxed households from 72% to 50% of the tax threshold caused an increase in the Gini points from roughly 40 to 50. However, these assumptions are not very realistic, and there is still a large gap between 1880 and 1898. In addition, our findings on rising inequality in the later nineteenth century are supported by the results presented by Hjerppe and Lefgren (1974) and the calculations done for Helsinki, Turku, Tampere, Viipuri, Vaasa, and Oulu.³³ Thus, income distribution was more unequal in the early twentieth century than at any other period in Finnish history.³⁴

The rising inequality of the late nineteenth and the early twentieth centuries took place during a time of increasing economic growth. The growth in real GDP per capita improved from 0.9% per annum during 1860–1880 to 1.9% during 1880–1913 (1.7% between our data points of 1880 and 1904) (Hjerppe 1989). Finland also industrialized: the primary sector's share of the GDP decreased from 62 to 43 percent between 1860 and 1913 (47% in 1904) (Hjerppe 1988, pp. 253–254). Also, the first era of globalization (1870–1913) might have accelerated the income gaps between people and regions (see, e.g., Lindert and Williamson

2001).³⁵ First, it increased especially the incomes of the companies and their owners. In Finland, the share of exported merchandise relative to overall GDP increased from 10% in the first half of the 1860s to, on average, 20% in the years 1880–1913. The main driver of the exports was in particular the wood processing industry: sawmills, pulp, and paper industries (Heikkinen and Hjerppe 1987). In particular, the wood industry's demand for wood raised the incomes and wealth values of the landowners, but, on the other hand, the landless lost their right to utilize the forests (Heikkinen 1997; Nummela 1990, pp. 219).

In general, more advanced economic structures correlated with higher income differences (urban-rural divide, and so forth).³⁶ For example, with more rapid economic growth, the income gap between coastal and inland provinces (especially eastern provinces) increased.³⁷ Furthermore, in the province of Häme (inland) average incomes increased by roughly 46% between 1870 and 1880, whereas the mean growth in other provinces was only 11%.³⁸ Compared with other inland areas, the Helsinki-Hämeenlinna (1862) and Hämeenlinna-Tampere (1876) railways attracted substantially large amounts of capital and boosted local businesses, including Finlayson, which grew to become one of the largest textile companies in northern Europe.³⁹

Figure 2 displays developments in manufacturing and agricultural workers' annual wages with respect to GDP per person years: the numerator captures returns on all factors of production, whereas the denominator only represents the returns on labor (see, e.g., Prados de la Escosura 2008).⁴⁰ The figure illustrates that agricultural workers' wages failed to keep up with the overall increase in income until the first decade of the twentieth century. Thus, the Y/A ratio supports our findings on rising inequality from the 1870s onwards.

However, agricultural workers' wages grew relative to GDP/person years during the shock around WWI, but fell behind during the phase of rapid increase in economic growth in the early 1920s. Also, the increase in workers' wages in the manufacturing sector were slower compared with the overall increase in incomes, despite the period of rapid increase from the mid-1870s to the 1890s. After that, the Y/M ratio also lends support to the conclusion of rising inequality.

Figure 2. (Here).

Previous studies have established that an increase in population growth leads to an increase in the price of land and in the number of landless people, which, in turn, increases inequality (Morrison 2000, pp. 253; Soderberg 1987; Lindert and Williamson 2016). This may partly be the case in Finland as well, since the share of day laborers in the agricultural sector increased from 22% in 1880 to 33% in 1910, while the share of farm servants on annual contracts declined from 10% to 4%. In total, the share of workers in the agricultural sector rose only by a few percentage points (38% in 1880, 41% in 1910), but the share of workers with insecure employment relationships thus increased (Heikkinen 1997, pp. 38). The overabundance of unskilled, itinerant agricultural workers led to the relatively poor wage growth. There was high income differences between the social groups in 1880: for example, public sector officials made, on average, more than 16 times as much and landowners 2.4 times as much money as sharecroppers (see appendix table B1).

The period of rising inequality was followed by a decline in the years 1914–24. Finland experienced a huge economic and political shock in 1917–18, the effects of which echoed

long into the interwar period. Finland, which had been an autonomous Grand Duchy of the Russian Empire from 1809 to 1917, gained its independence in late 1917 after the collapse of the Russian Empire. Within only a few months, political conflicts escalated into a revolution and a bloody civil war (Heikkinen 2017, pp. 66).⁴¹ Inequality has been characterized as one of the “structural” reasons—besides political and ideological factors—leading to the civil war, which has been interpreted as a war between, roughly speaking, the landowners and the landless (Nummela 1990, pp. 201–202). The civil war, together with the loss of export markets, resulted in a massive drop in GDP: in 1918, the GDP was one third the level of 1913—a drop that was one of the highest in Europe. The Finnish GDP recovered to its pre-war level only in 1922 and the GDP per capita level in the next year, but the manufacturing sector’s share of the GDP did not recover until the end of the 1930s (Heikkinen 2017, pp. 67–69; Hjerpe 1988, pp. 253–258).

Even though the capital share of GDP increased in the first two years of WWI, it eventually dropped below wartime levels and did not recover until 1926 (figure 3). The brief increase was presumably caused by the stock market boom in Helsinki in 1916. However, the crises in 1917–18 depreciated the value of stocks, and the real three-month average on stock returns was negative until 1922.⁴² After the first two years of the war, inflation sped up to run at double-digit rates from 1915 onwards, resulting in a ten-fold price level increase in the early 1920s compared with 1913. The high rate of inflation was a shock to capital, since it depreciated the value of bank deposits and obligations. Obviously, the relative “winners” during the periods of high inflation were the farmers and those without any bank deposits. In fact, most households did not have substantial savings, even though the number of

savings accounts had increased considerably from 15,193 in 1870 to over 300,000 before WWI.⁴³

Figure 3. Here.

Furthermore, the progress in wages supported developments towards a more equal distribution of income. Wages had recovered by 1920, after which they exceeded the previous wartime levels. The nominal wage gap between workers in the manufacturing industry and agricultural workers had been roughly 50% before WWI, but the gap diminished in 1916–17, while the real wages of state officials fell sharply (Heikkinen 2017; Kortteinen 1985).⁴⁴

Public finances were in dire straits due to the exceptional war years. After the civil war (1918), as Finland became a democratic sovereign state, officials faced more pressure to change redistributive policies compared to the nineteenth century. Already in 1915, they had imposed a provisory income tax with a top marginal income tax rate of over 50%.⁴⁵ However, the top marginal tax rate decreased to 20% in 1920, when a permanent income tax was established.⁴⁶ Only the war taxes had a significant redistributive effect in the short term (figure 1). Another example of “the new politics” was the partitioning of land. A law passed in 1918 prescribed that sharecroppers could redeem their leased land (Peltonen 1992). Since the price was set at the levels of the year 1914, sharecroppers benefitted from the inflation, being able to redeem their lots at a low real price (Rasila 1970, pp. 361–366). In addition, the state cleared and supported the acquisition of new land. More than 100,000 landless peasants obtained their own land to cultivate as a result (Saaritsa 2008, pp. 10–11).

The Finnish economy recovered and stabilized in the 1920s, which gradually changed the direction of inequality. For instance, the Gini coefficient rose from 42.0 in 1924 to 43.8 in 1929. Finland had been a small open economy with a high exports-to-GDP ratio before WWI. However, the shocks of WWI, the Russian Revolution and the Finnish Civil War diverted the Finnish economy from this path, but only temporarily, since it returned to it quite quickly from 1919 onwards. Finland returned to the long-term trajectory: real GDP per capita grew from 1913 to 1929 by 1.6% per annum (and 5.0% from 1919 to 1929). The monetary situation stabilized after Finland joined the new gold standard in 1926 (Kuusterä and Tarkka 2011).

While income inequality increased during the boom period of the latter half of the 1920s, the Great Depression halted the trend (the Gini coefficient was 43.5% in 1934). The depression was relatively mild compared with most other national economies under study. The real GDP per capita was at its lowest in 1932, when it was 6.3% lower than in 1929. Finland recovered more swiftly than other countries: the real GDP already exceeded the pre-crisis level in 1933, while per capita GDP exceeded it a year later (Hjerppe 1989).

5. The Drivers of Income Inequality

The explanations for the rise and fall of income inequality in general and for the period under study here in particular are numerous, but they can be summarized based on the following four factors: 1) institutions (e.g., Atkinson 2015; Lindert 2004), 2) the level of income (e.g., Kuznets 1955; Milanovic et al. 2011), 3) capital (e.g., Piketty 2001), and 4) shocks

(e.g., Piketty 2014; Scheidel 2017). In the following section, we discuss these drivers of income inequality in Finland between 1865 and 1934. The three differing phases to be explained are, as stated above, 1) the rapid rise in inequality from the 1860s to the early years of the twentieth century, 2) the swift decline in inequality between 1904 and 1924, and 3) the relatively stable level of inequality from 1924 to 1934. By comparing Finland with other countries, we try to find the peculiarities and generalities of Finnish economic development.

Many recent studies (e.g., Piketty 2014; Morrison 2000, pp. 251–252) have emphasized that the institutional framework of the eighteenth and nineteenth centuries upheld inequality since the privileged classes benefitted from having preferential economic rights and possibilities. The institutional setting of Finland at the beginning of our research period, the 1860s, was that of an estate society placing restrictions on people's ability to move, study, work, or act as entrepreneurs (Voutilainen 2016; Kekkonen 1987). For landless persons, the chances of obtaining land of their own to cultivate were relatively small (Voutilainen 2016, pp. 206).

In this respect, a fundamental change occurred in Finland in the 1860s–1880s: the old economic restrictions were abolished and freedom of trade became common policy (Kekkonen 1987). Furthermore, at least in central Finland, the structure of the wealthiest households diversified in the late 19th century more than previously: the dominant role of the nobility and other great landowning social groups in society became more limited. The richest members of society also included large merchants, owners of industry, and high-ranking state officials (Markkanen 1977, pp. 191–201). For example, the evidence from

France supports these findings: industrialization benefitted manufacturers, large merchants, and bankers, while it did not benefit to the same extent the lower middle class (civil servants, professionals) or the aristocracy (Morrison 2000, pp. 247–248). It seems, thus, that the abolition of institutional restrictions in Finland increased rather than diminished income inequality.

Since it can reasonably be argued that Finnish institutions in the 1860s mainly benefitted the upper parts of the social stratum, we may well ask, why were income differences not higher? The idea of maximum possible inequality offers one explanation. When average income is close to the subsistence level, then the most extreme levels of income inequality are impossible because any surplus above the subsistence level constrains the levels of inequality: higher levels of inequality mean that the poorest people will starve to death (Milanovic et al. 2011; Milanovic 2016). Thus, a low average income level results in an inequality possibility frontier, but later advances in productivity enable higher income differences.⁴⁷ The extraction rate measures the ratio of the actual Gini coefficient to the theoretical maximum.

The maximum and actual Gini coefficients as well as the extraction rate for Finland in the years 1865–1934 are all displayed in figure 4. Note that economic growth pushed the inequality possibility frontier upwards after the famine of 1867–68, the last peace-time famine in Western Europe, which can be considered the ultimate proof of the proximity of a subsistence minimum in Finland. Finland's population decreased by 6% because of the famine: the poorest social groups experienced excessive mortality rates and a decline in the number of births due to the fact that food was unequally distributed (Voutilainen 2016;

Häkkinen and Peltola 2005, pp. 41–45).⁴⁸ Thus, this shock reduced income differences in the cruelest of possible ways; the reducing effect of the shock is in line with the findings presented in the existing literature (see, e.g., Scheidel 2017).

Figure 4. (Here)

The Kuznets curve theory has a close relationship with the idea of maximum inequality. According to Kuznets (1955), income inequality increases together with the development of a society. The assumption is that the improvements in productivity differ between urbanized and rural areas, which causes greater income differences. In addition, the increasing influence of the urban population, where the average incomes as well as the income differences are higher, will increase inequality.⁴⁹ When investigating this hypothesis, it is obvious that a diachronic comparison over time is insufficient when comparing economies with markedly different income levels. For instance, when comparing inequality in the UK and Finland in the 1860s, we should remember that the UK's GDP per capita was more than triple that of Finland.⁵⁰

Figure 5 plots the actual and the maximum Gini coefficients from the 16th century until the break of WWI against the level of real GDP per capita in 2011 PPP dollars. Remarkably, the Finnish data for 1865–80 adds an entirely new income category (GDP per capita below \$1,300). The addition of Gini coefficients from such a poor country as Finland in the nineteenth century lends support to the Kuznets curve as well as to the maximum inequality hypotheses. The average income level at the peak period of inequality was approximately between \$2,000 and \$3,000, although wide variations appeared between countries. The

findings are indecisive due to a lack of comprehensive data; however, they suggest that the income level had a significant role for income inequality in poor countries. On the other hand, the effect is diminished when the income level increases.

Figure 5. Here

Figure 6 supports and illustrates the previous finding: the Gini coefficients in Finland were rather moderate compared to those in several other countries for the years 1865–80. Subsequently, Gini coefficients for Finland increased roughly to the same levels as in the other countries under comparison by the end of the century. Inequality also increased in Norway during this period, whereas in Denmark developments moved in the opposite direction. On the other hand, the Gini coefficients remained at similar levels or slightly decreased in the first decades of the twentieth century.⁵¹

Figure 6. Here.

The patterns of income inequality before 1914 have provided some support for the Kuznets curve theory. For example, Morrison (2000) and Grant (2002) have emphasized the case of Germany as a clear example of the Kuznets curve for the years 1822–1914. Likewise, the characteristics of developments in Prussia were remarkably similar as in Finland: the beginning level of inequality was relatively low, and the level of inequality in rural areas increased, *inter alia*, due to demographic pressure. Moreover, the evidence from France supports the theory as well: relatively early industrialization and urbanization clearly magnified inequality through wage stagnation, a surge in capital incomes, and

concentration of wealth from 1820–30 to 1860–1870. The second phase of increasing inequality lasted from the 1890s to the beginning of WWI (Grant 2002; Morrison 2000, pp. 233–255). Furthermore, studies from the U.S. revealed that income inequality rose during the period of rapid increase in economic growth and industrialization between 1800 and 1860 (Lindert and Williamson 2016).

What about the Nordic countries? A wide range of evidence suggests that inequality increased from 1870 to 1914 in Sweden, which seems to fit the Kuznets hypothesis (Morrison 2000, pp. 225–229).⁵² Also, the widening wage gap between skilled and unskilled workers was similar in Finland and Sweden. Furthermore, Norway exhibited many of the same characteristics as Finland in the nineteenth century. For example, both countries were pre-industrial and relatively poor, in which the developments in income inequality followed a similar pattern. In addition, both countries experienced rapid economic growth and a swift movement of population from rural areas to urban areas in the late nineteenth and early twentieth centuries (Aaberge and Atkinson 2010, pp. 459; Morrison 2000, pp. 255).

However, the Kuznets curve is insufficient for explaining the long-term changes in inequality in some countries. For example, Denmark differs remarkably from the traditional Kuznets curve hypothesis (Atkinson and Søgaaard 2016; see figure 6). Neither does evidence from Italy between the 1860s and early twentieth century support the theory, but rather seems to be more in line with the hypothesis of “benign industrialization” (Brandolini and Vecchi 2011, pp. 13). In addition, there is evidence that income inequality in the Netherlands decreased during the last decade of the nineteenth century, followed by a period of stability before WWI. On the other hand, the limited evidence is mixed regarding the UK, where

some studies suggests that inequality increased from 1688 to 1867, and, on the other hand, decreased until WWI (Lindert 2000). In conclusion, the developments in the Netherlands, Denmark, and Italy shows that inequality fails to systematically follow industrialization, which goes against the main premise of the Kuznets theory.

However, the GDP per capita in these countries were relatively high in comparison, which means that “the income level hypothesis” cannot entirely be rejected (figure 5). Existing examples indicate that the overall rise in incomes played a major role during the first phases of modern economic growth in increasing inequality, for example in the increase in economic inequality from the fourteenth to the nineteenth centuries in the Low Countries (Ryckbosch 2015; Piketty 2014; see, e.g., Morrison 2000). Likewise, inequality increased in France in the eighteenth century before the Revolution of 1789 (Morrison 2000, pp. 239). Thus, we argue here that income level is a crucial factor in explaining the variations in income inequality during the pre-WWI era.

Furthermore, the expanding literature on inequality shows that capital plays a major role in income distribution (e.g., Piketty 2014). Also, many studies indicate that wealth was more concentrated in the late nineteenth century than before (see appendix figure C1). The concentration of wealth was partly due to the savings rates: in a poor society, only the upper class is for the most part able to save, allowing such persons to in turn further accumulate wealth and capital incomes (see, e.g., Piketty 2014).

Piketty’s $r-g$ theory additionally highlights the difference between the return on capital (r) versus economic growth (g). If r is greater than g , then the incomes of “capitalists” increase more than the incomes of salary earners (and vice versa), even though the

inequality of wealth remained unchanged. Piketty (2014) has argued that before the twentieth century, the rate of return was higher compared with economic growth. The case in Finland seems similar since the deposit and bond interest rates were higher compared with the growth in GDP and per capita. In the years 1870–1913, nominal GDP grew at an average annual rate of 3.9% and GDP per capita at 2.5% per annum, whereas the average deposit rate was 4.3% and bond rate 4.6% during the same period (Autio 1996; OSF 2017; Hjerpe 1989).⁵³ Thus, the $r-g$ hypothesis does fit the Finnish case before WWI.⁵⁴

Although the rise in income inequality in Finland from 1871 to 1904 can be interpreted partly in terms of the Kuznets cycle, the rapid and sudden decline in income differences between 1904 and 1924 cannot be explained as a result of “normal” economic progress. The Kuznets cycle forces, that is to say, people moving from primary production to more productive jobs and the gradual decrease in the productivity gap, are such slow processes that they did not have a major role here.

Fortunately, a growing body of literature has investigated top income shares in the early twentieth century: the trends for the top 1% of shares varied between countries, but the rough patterns were reasonably similar (figure 7). During WWI and its aftermath, until roughly the mid-1920s, the top income shares decreased. However, strong variations occurred in some countries. For example, in Sweden, Denmark, and the Netherlands the top income percentile's share peaked at a staggering 27–28% in 1916–17, although the shares dropped to lower levels after the war compared with the early twentieth century. Also, the income shares in Finland were roughly similar or at lower levels than in the other countries between the years 1920 and 1934. In most countries, the top shares slightly recovered from

the shocks in the latter part of 1920s. Nevertheless, the next shock (the Great Depression) started in the United States in 1929 and seemingly decreased the top shares in most countries, especially in the U.S., France, the Netherlands, and Sweden. The Great Depression had an insignificant effect on top income shares in Finland, where they were relatively low in comparison. The development was rather similar in Denmark.

Figure 7 Here

Thus, instead of interpreting the decline as the downward slope of the Kuznets cycle, we consider it as a result of shocks and recovery. The role of shocks has been emphasized especially by Piketty (2014, 2015) and Scheidel (2017). The decline in income inequality in the twentieth century was predominantly caused by the shocks to wealth and capital incomes as well as the introduction of the new redistributive politics (e.g., Piketty and Saez 2006). These mechanisms seemingly also explain the decline in inequality in Finland between 1904 and 1924, since Finland experienced severe economic and social shocks, for example a civil war (see section 4). The top percentile's share of total wealth as well as its capital share decreased sharply during the 1910s (figures 3 & appendix C1). Thus, the wealthiest group of individuals suffered considerably from these shocks, which resulted in a reduction in their wealth and income.⁵⁵ The abandoning of the gold standard enabled a high inflation rate, which depreciated the real value of bank deposits and securities. In the years 1913–1924, nominal GDP grew at an average annual rate of 25.9% and GDP per capita at 25.0% per annum, whereas the average deposit rate was only 5.3% and the Finnish central governments' foreign bond rate was 8.0% during the same period (Autio 1996; OSF 2017;

Hjerppe 1989; Arola 2006). Additionally, the return for stocks traded on the Helsinki Stock Exchange grew at considerably lower levels compared with GDP, with an annual average return of 13.1% (Nyberg and Vaihekoski 2009). Thus, it is obvious that the r - g -mechanism worked against capital during this decade. Furthermore, in the longer term, as emphasized by Piketty (2001), taxes played an important role in the redistribution of incomes through preventing the accumulation of vast fortunes.

6. Conclusions

This study presented a new series on income inequality in Finland for the years 1865–1934 and discussed the factors behind the trends. Though income inequality in Finland was high by modern standards, it was relatively moderate in comparison with contemporaries at the beginning of the period, in the 1860s and 1870s. In the estate society before 1870s, capital and the discriminating institutional framework pushed the inequality to higher levels; these factors were, on the other hand, restricted by famine and other shocks.

Also, the inequality possibility frontier was low because of low income levels, which acted as a restraining factor on overall income inequality. As economic growth gained significant speed, income inequality also increased until the early twentieth century. Thus, this study has highlighted that an increasing level of income in the early phases of economic growth is a crucial factor for income inequality. Furthermore, the findings suggest that Finland experienced the upward part of the Kuznets curve in the years 1870–1913, which was strengthened by eras of increased globalization and greater liberalization politics. In

addition, the rate of return remained considerably higher in contrast to economic growth, which, together with an overabundance of unskilled agricultural workers, generated a rising contrast between the haves (landowners, owners of industry, grand merchants, and high-ranking state officials) and the have-nots (landless persons).

Although rising inequality levels up to WWI fit the Kuznets curve hypothesis, the sudden declining phase (1914–24) should be interpreted as the result of economic and political shocks rather than as the product of “normal” economic progress. Finland experienced massive economic and social shocks because of WWI and the brutal civil war. High inflation, after abandoning the gold standard, erased the real value of bank deposits. Accumulated wealth and capital incomes were severely affected by these shocks. Finally, “the new redistributive politics” (taxes and the partitioning of land) had an instant and moderately equalizing effect, but in the long run they effectively hampered the more well-to-do persons from regaining their former wealth and incomes.

The study is the first comprehensive exploration of income inequality in Finland from the 1860s to the 1930s. Thus, it leaves many topics open for further examination. To develop a full picture of the development of income inequality, additional studies will be needed that, for example, obtain new data points for the years between 1860 and the 1920s and study income inequality between and within different social groups as well as between rural and urban populations. Furthermore, the long-term developments in labor, wealth, capital shares, inequality between regions, and land rents could enlighten our understanding of the drivers and aspects of inequality.

These results notably broaden the comparative dataset on Gini coefficients and top income shares with respect to the poor end of the income axis. The early Finnish data adds a new piece of evidence in support of the increasing part of the Kuznets curve theory as well as the inequality possibility frontier hypotheses, but, on the other hand, it disproves the decreasing part of the Kuznets curve. In addition, international comparisons make it clear that WWI and the economic and political shocks related to it greatly affected inequality, although the variation between countries fluctuated tremendously depending on the relative strength of the shocks. As these results indicate, income inequality is a complex phenomenon, one which can rarely be explained by just one theory. However, this study has highlighted the role of economic growth in a poor country and the shocks that helped pave the way for a more equal society.

List of Figures and Tables

	State income tax	Municipal income tax	High income tax	Income and property tax
Year	1865, 1871, 1876, 1880	1898–99, 1904	Highest income of the years 1912–15, and 1916	1920–22, 1924, 1926, 1929, 1931, 1934
Tax unit	Household	Household	Household	Household
Companies	Included (dividends) / In 1880 profits.	Separate tabulations (excl. 1904).	Separate tabulations.	Separate tabulations.
Income estimates	Tax boards and tax payers' notification	Tax boards and tax payers' notification	Tax boards and tax payers' notification	Own notification
Tax units (% of all households)	18.8–31.2	65.8–76.0	0.8	56.9–79.4
Number of income brackets	7	Rural: 19–20, urban: 16	micro data	over 40
Income concept	C. disposable income	C. disposable income	C. disposable income	Market income
Dividends	No. Dividends are included if company did not pay income taxes.	Cities: No. Rural: Yes.	Yes	Mainly yes. Not included: partnership company
Inheritances	Included if inherited from outside the “family”	Included if inherited from outside the “family”	Included if inherited from outside the “family”	No
Profit from sales	No	No	No	Yes
Foreign income	Yes	Yes	Yes	Yes
Housing income	Yes	Yes	Yes	Yes
Deductions				
Dues to “the public sector”	All transfers paid to the State, Municipality or Church.	All transfers paid to the State, Municipality or Church (pensions included in urban areas)	All transfers paid to the State, Municipality or Church (exc. pensions)	Only paid pensions.
Expense allowance	Yes	Yes	Yes	Yes
Interest of the loans	Yes	Yes (cities). No (urban areas)	No	Yes
Investments	No	No	Part of the investments	No
Family composition	Deductions from agriculture incomes produced by children (excl. 1865)	Deductions from agriculture incomes produced by children	Deductions from agriculture incomes produced by children	Deductions for children (below 15 years of age).
Depreciation	No	No	No	No
Not included	Non-profit corporations, insurance companies (excl. 1865), inhabitants of Lapland	Non-profit corporations (incl. state corp.), inhabitants of Lapland, Russian officials (urban)	Non-profit corporations (incl. state corp.), many types of officials' extra remunerations	Non-profit corporations. Possible deductions from higher living costs (area based) or illness

Table 1. The Characteristics of the income taxes, 1865–1934

Sources: Statute book: 1883 N:o 4/8, 1889 N:o 21, 1898 N:o 21 & N:o 23, 1915 N:o 6, 1916 N:o 21 & 59, 1917 N:o 126, 1920 N:o 207 & 300, 1927 N:o 6, 1931 N:o 174 & 34. OSF IV 1–4; Hjelt and Broms 1904, 1905; OSF IV B 1–4; NAF 1916; OSF VI 1; OSF VI 9; OSF VI 22; OFS VI 37; SYF 1936, pp. 8; Vattula 1983, pp. 47–49; Wikström 1985; Harvia 1919; Jäntti 2006; Jäntti et al. 2010.

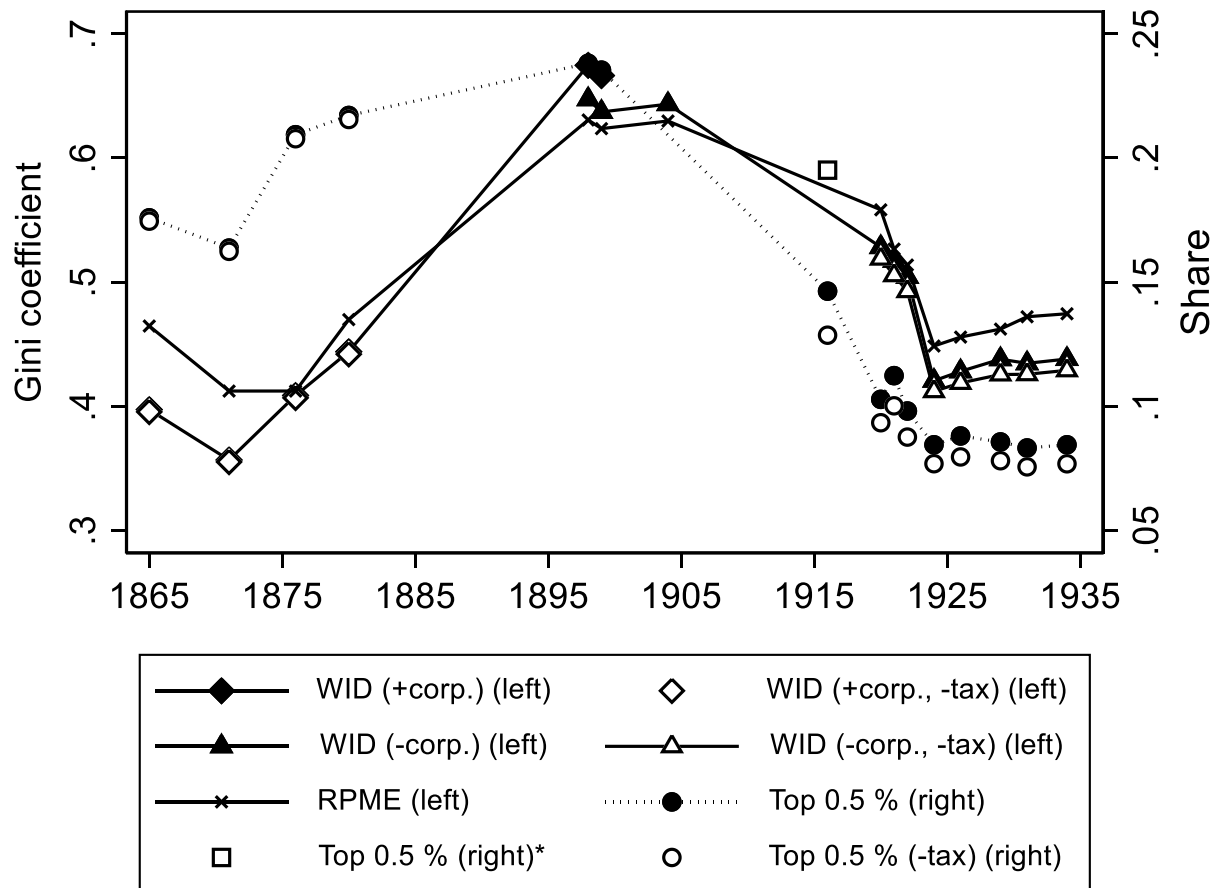


Figure 1. The development of the Gini coefficient and the top 0.5% share in Finland, 1865–1934.⁵⁶

Sources: Authors' calculations, see text.

Note: WID = estimated Gini coefficients, RPME = control series (see text).

+ (-) corp = corporations are included / not included.

- (+) taxes are deducted / not deducted from the incomes.

* The total household income is assumed to be 42% of the GDP.

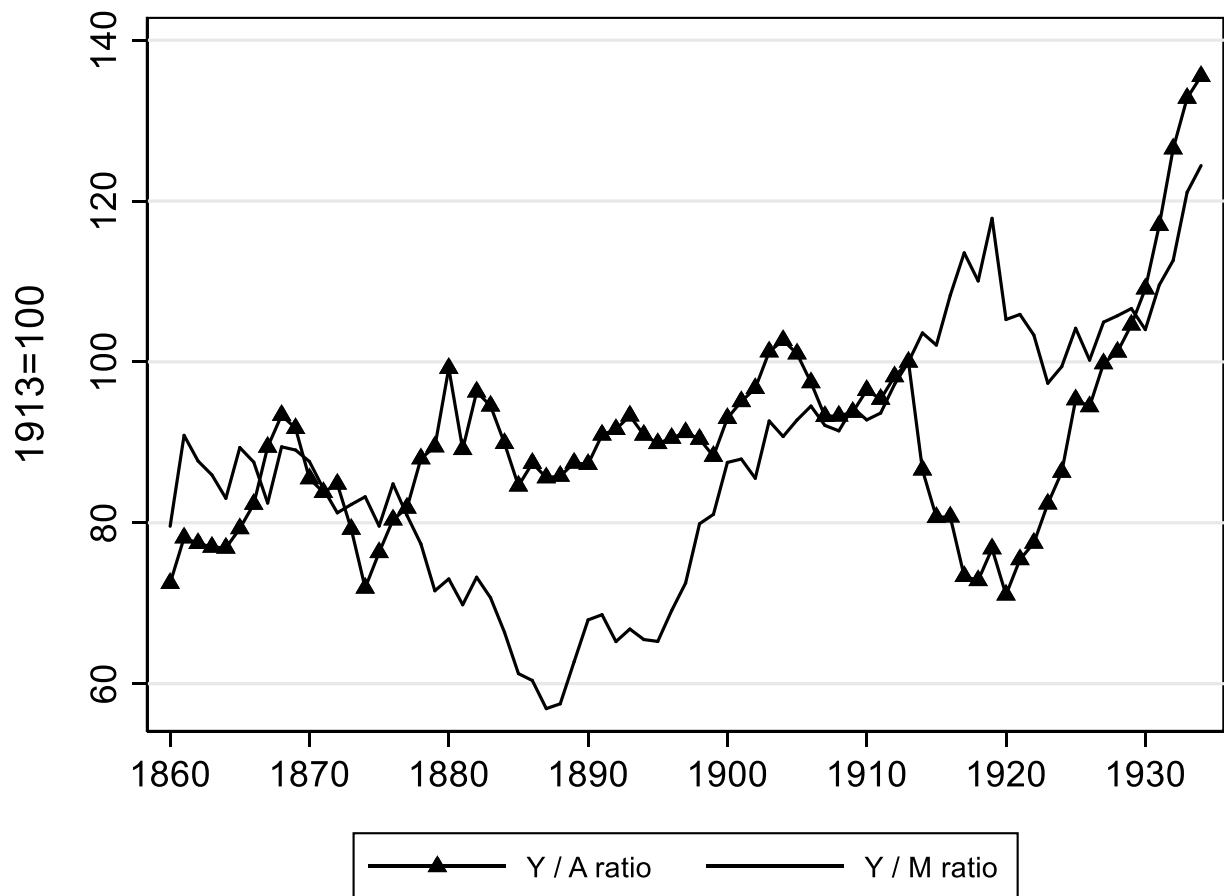


Figure 2. The Williamson indexes, 1860–1934 (1913=100).

Sources: Authors' calculations, wages (Heikkinen 1997; Soininen 1981; OSF XVIII A: 30–51), Manufacturing statistics 1913–34 (Statistical yearbook of Finland 1914–38), GDP per working year (OSF 2017; Hjerppe 1989).

Note: Y = Nominal GDP per worked year, A = nominal annual wage of an agricultural worker, M = nominal annual wage of manufacturing worker.

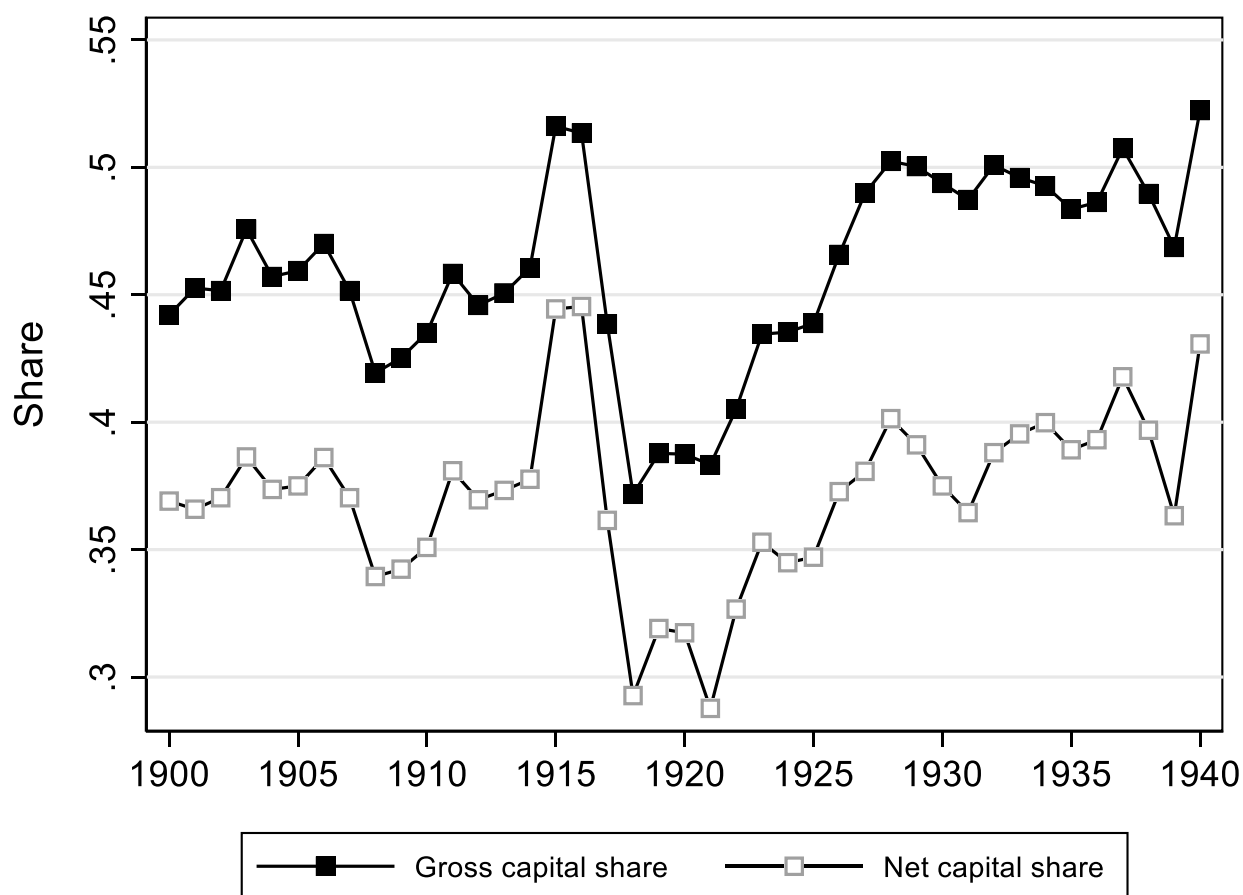


Figure 3. The share of capital incomes, 1900–40.

Sources: Bengtsson and Waldenström 2017.

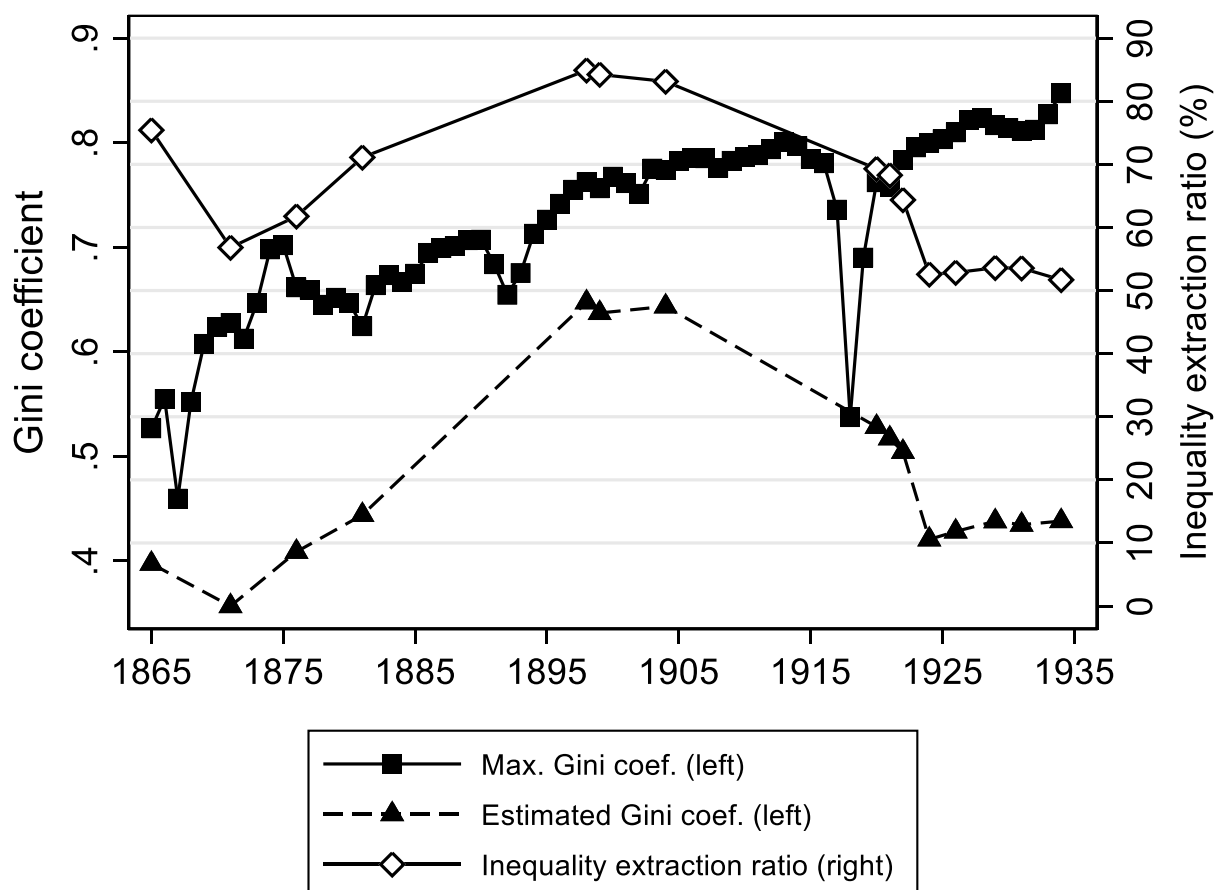


Figure 4. The “maximum” and estimated Gini coefficients, and the inequality possibility frontier, 1865–1934.

Sources: Authors’ calculations, methodology proposed by Milanovic et al. 2011 and

Milanovic 2016.⁵⁷ Note: The subsistence minimum was estimated based on the level of

consumption for housing, heating, and foodstuffs by two poor families in 1887 (Lilius

1888). The family size was corrected to fit the average household. The calculated

subsistence level was extended to other years by using the cost of living index (Heikkinen

1997, 2017). The subsistence level was compared with the GDP per household (OSF 2017;

Hjerppe 1989).

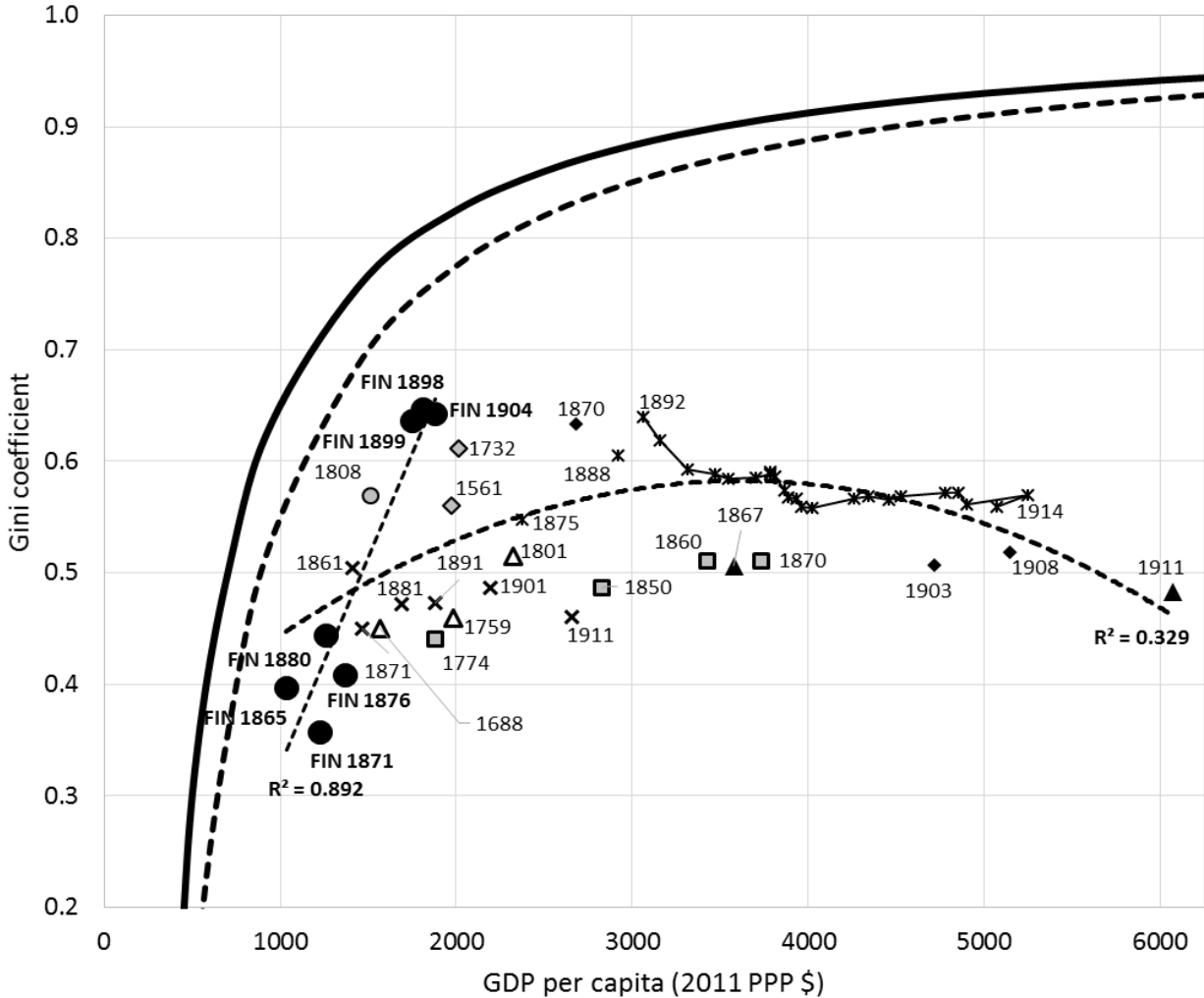


Figure 5. The “actual” and the “maximum” Gini coefficients compared with GDP per capita in 2011 GK \$, until WWI. * The subsistence level was set at 350 or 450 in 2011 PPP \$. The upper bound of 450 \$ is based on the World Bank’s poverty line used in 2011, \$1.25 per day, while the lower bound of 350 \$ is based on the argumentation presented by Milanovic et al. (2011).

Sources: WID database; Maddison database; Lindert and Williamson 2016; Atkinson and Sørensen 2016; Sørensen 2016; Sørensen and Brandolini 2011; Milanovic et al. 2011; Dumke 1991.

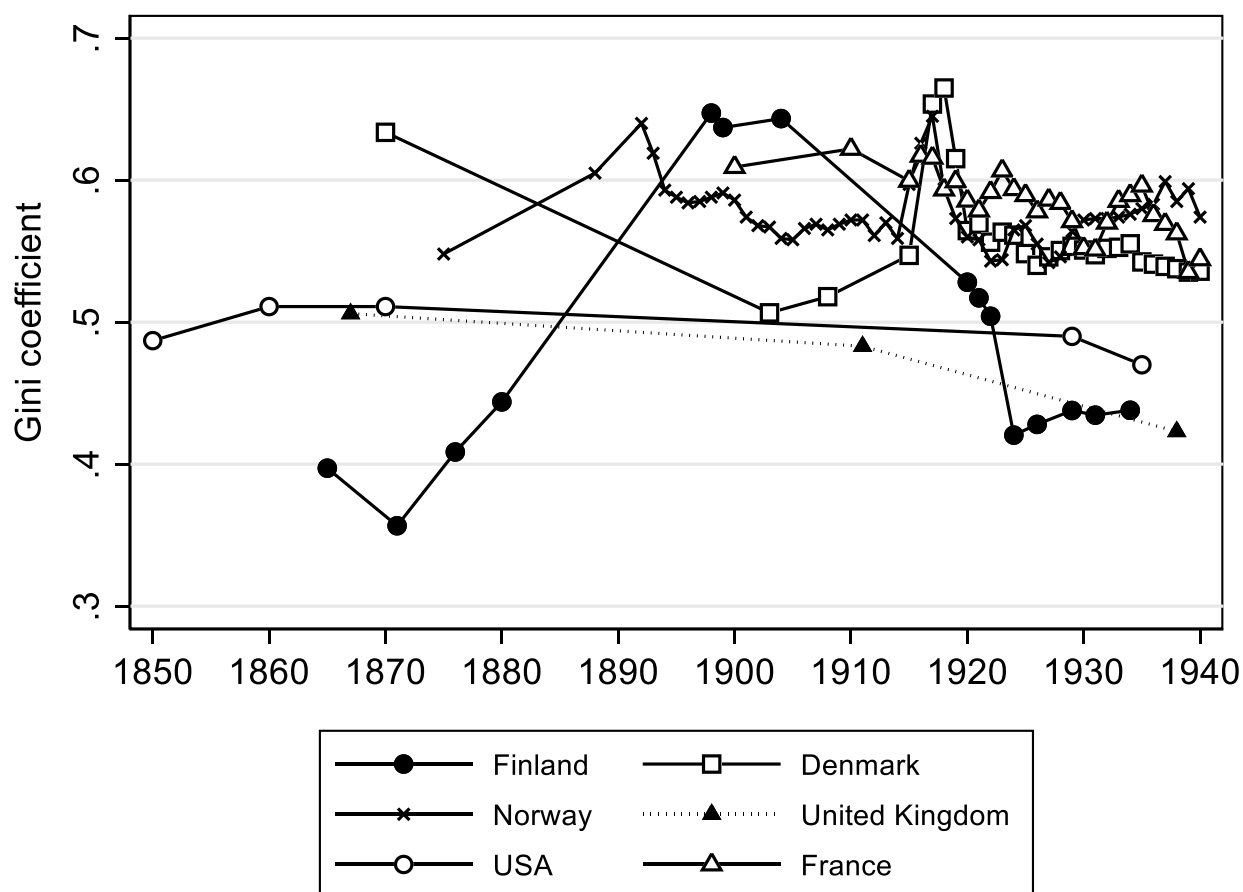


Figure 6. The Gini coefficients for Finland, Norway, Denmark, the UK, France and the USA, 1850–1940.

Sources: Finland 1865–1934 (authors' calculations, see text), Denmark 1871–1926 (Atkinson & Sogaard 2016), USA 1850–70 (Lindert & Williamson 2016), other (WID database).

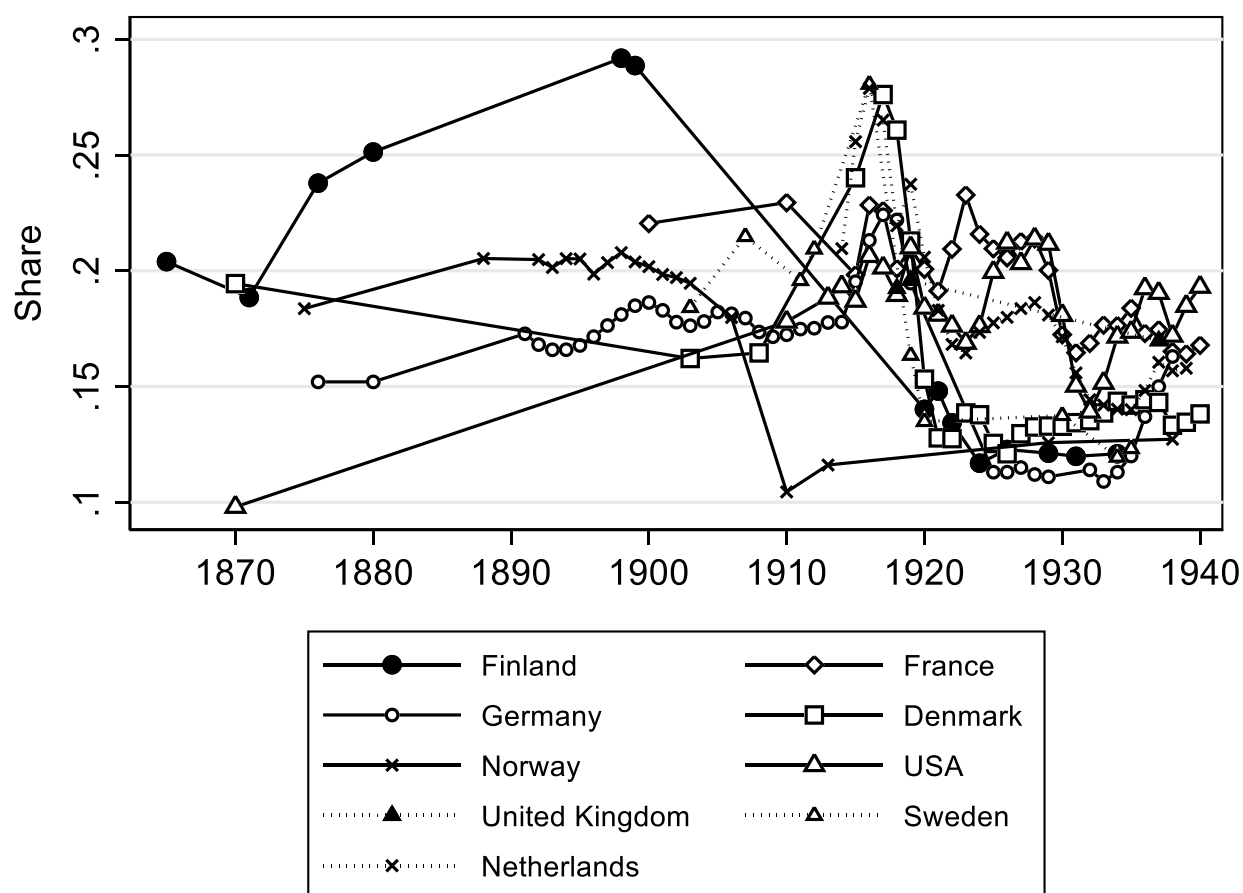


Figure 7. Top 1% of income shares, 1865–1940.

Sources: Finland 1865–1934 (authors' calculations, see text), Germany 1876–1880 (Dumke 1991), USA 1870–1910 (Lindert and Williamson 2016, p. 173), other (WID database).

Year	Tax	Population (1 000)	Tax units	Average size of the tax unit	Taxed (%)	Income total (nominal, FIM 1 000)	Income total (%) of GDP
1865	State Income Tax	1,827.0	428,782	4.26	18.8	223,517	65.74
1871	State Income Tax	1,768.8	418,372	4.23	21.4	205,221	55.02
1876	State Income Tax	1,942.7	442,731	4.39	28.5	242,907	45.40
1880	State Income Tax	2,060.8	454,339	4.54	31.2	270,896	57.27
1898	Municipal Income Tax	2,610.3	601,969	4.34	71.9	524,113	55.86
1899	Municipal Income Tax	2,635.3	609,029	4.33	76.0	546,549	56.69
1904*	Municipal Income Tax	2,751.9	646,122	4.49	65.8	-	-
1916	State High Income Tax	3,114.2	775,386	4.02	0.8	-	56.00
1920	State Income Tax	3,147.6	804,354	3.91	56.9	5,515,393	35.93
1921	State Income Tax	3,193.2	823,387	3.88	74.2	7,040,018	41.10
1922	State Income Tax	3,227.8	839,904	3.84	79.4	7,802,173	42.07
1924	State Income Tax	3,286.2	870,996	3.77	70.2	9,187,829	40.43
1926	State Income Tax	3,355.2	906,130	3.70	73.1	10,130,552	40.19
1929	State Income Tax	3,435.3	954,895	3.60	77.2	11,730,010	44.23
1931	State Income Tax	3,489.6	979,537	3.56	67.3	10,351,958	48.59
1934	State Income Tax	3,561.6	999,747	3.56	65.3	10,464,916	40.08

Table A1. The main characteristics of the data

Source: see the list of sources and the text.

Note: * Information only from the rural areas. The totals for the different income brackets are absent.

Income bracket (FIM)	Number of tax units
500–1,000	114,417
1,000–5,000	24,543
5,000–10,000	1,818
10,000–50,000	905
50,000–100,000	41
over 100,000	25

Table A2. Income tax statistics for 1880

Source: OSF IV 4.

Province	State officials, employees of the church, and officials in the public sector	Merchants, craftsmen, incorporated companies, owners of the factors and banks etc.	Landowners sharecroppers	Landowners	Sharecroppers	Foreigners	Other	Average
Uusimaa	29.9	16.8	5.2	7.8	1.3	9.4	2.6	11.4
Turku and Pori	16.6	15.1	3.3	4.1	1.5	16.7	3.9	7.7
Häme	13.9	14.4	2.9	4.5	1.3	13.0	2.7	5.8
Viipuri	18.7	25.3	2.0	2.1	1.5	11.0	1.4	4.6
Mikkeli	16.5	9.4	2.3	3.0	1.2	32.0	5.0	3.4
Kuopio	18.7	10.0	2.1	2.4	1.1	58.7	1.8	3.8
Vaasa	16.2	16.2	1.9	2.2	1.1	20.4	2.7	4.0
Oulu	14.6	12.6	1.9	2.1	1.3	8.0	6.2	4.8
Average	21.1	16.1	2.7	3.1	1.3	11.9	2.7	6.1

Table B1. The average FIM taxed per household for different social classes and provinces, 1880

Sources: OSF IV 4.

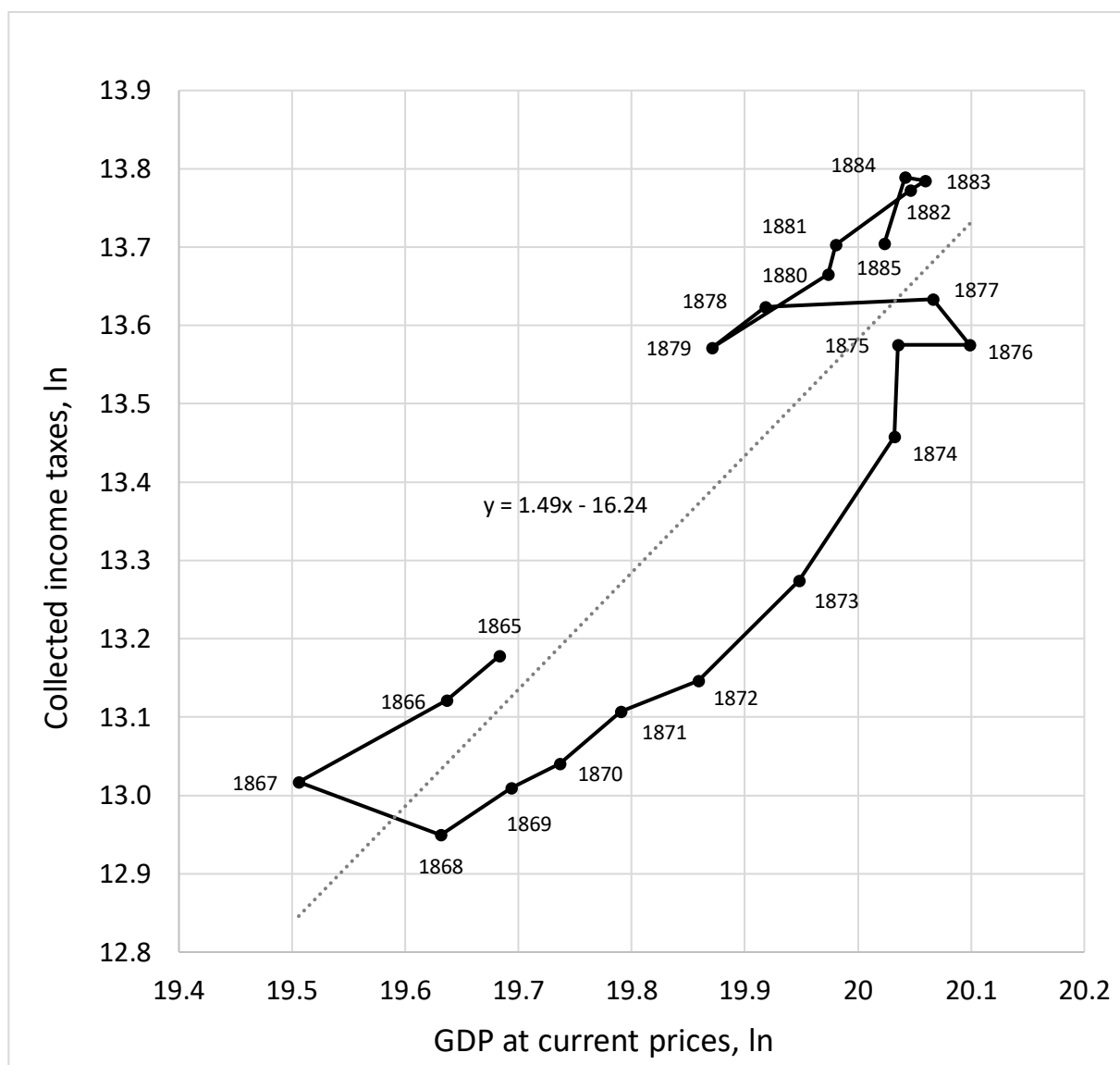


Figure B1. Collected income taxes and GDP, 1865–1885.

Sources: OSF IV:4; Statistical yearbook of Finland, 1879–88; Hjerppe 1989.

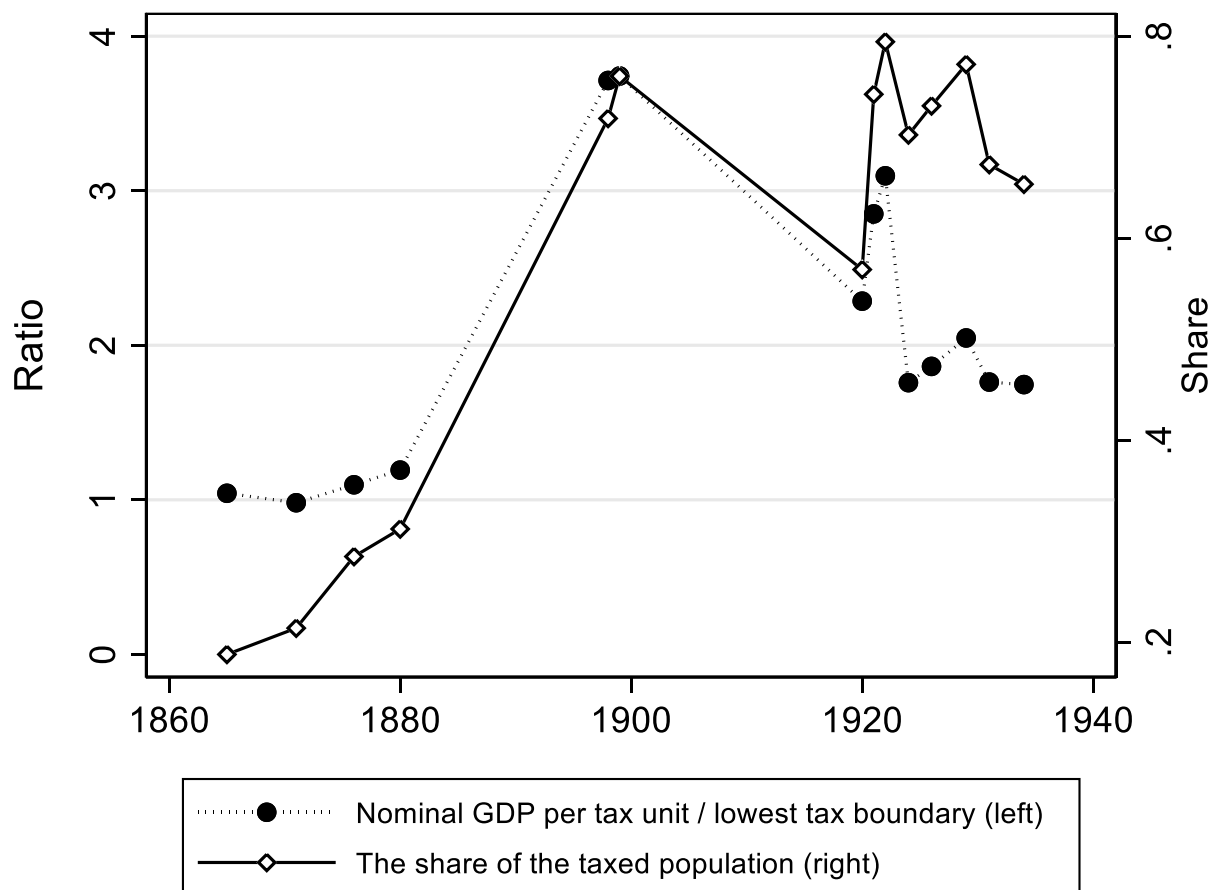


Figure B2. Nominal GDP per household relative to the lowest tax boundary and the share of the taxed population.

Sources: Authors' calculations, see text; OSF 2017; Hjerpe 1989.

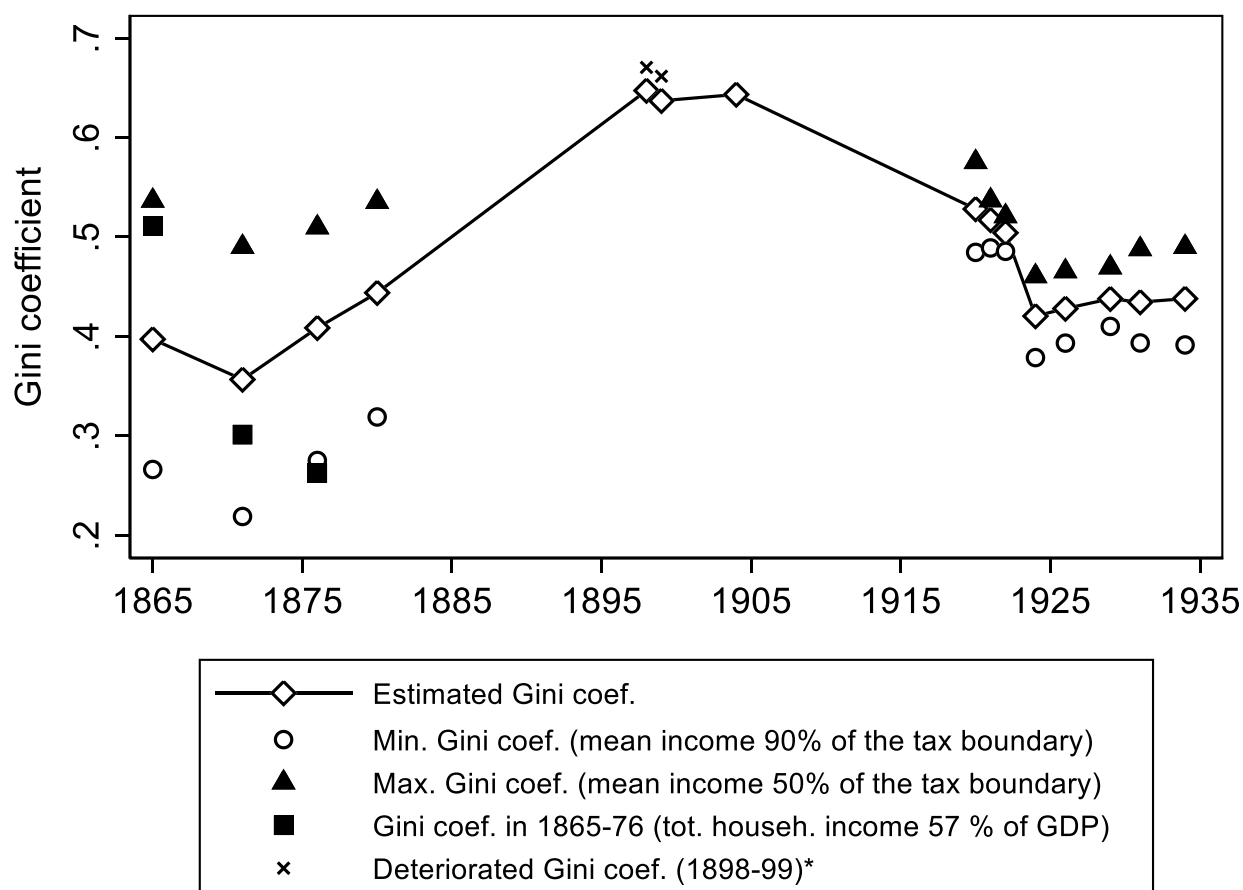


Figure B3. Robustness checks, 1865–1934.

Sources: Authors' calculations, see text.

Note: min = non-taxed average incomes, which were set at 90% of the lowest tax boundary; max = non-taxed average incomes, which were set at 50% of the lowest tax boundary.

* Income brackets are removed until only roughly 30% of the households were taxed.

Year	Gini coeff.	Top 10%	Top 5%	Top 1%	Top 0.5%	Top 0.1%
1865	39.7	37.4	31.5	20.4	17.6	10.1
1871	35.7	32.7	27.3	18.8	16.4	10.4
1876	40.9	38.6	33.3	23.8	20.9	13.7
1880	44.4	42.7	36.4	25.1	21.7	13.4
1898	64.7	57.1	46.9	29.2	23.8	15.1
1899	63.7	56.6	46.5	28.9	23.5	14.8
1904	64.3	-	-	-	-	-
1916	-	-	-	-	14.6	8.8
1920	52.8	41.5	29.6	14.0	10.3	5.2
1921	51.7	40.5	29.4	14.8	11.2	6.3
1922	50.4	39.2	28.2	13.4	9.8	4.8
1924	42.0	35.3	25.2	11.7	8.4	4.2
1926	42.8	36.3	26.3	12.3	8.8	4.1
1929	43.8	36.7	26.5	12.1	8.6	3.8
1931	43.5	37.2	26.7	12.0	8.3	4.6
1934	43.8	37.2	26.8	12.1	8.4	3.7

Table C1. The Gini Coefficients and the Top Income Shares (%).

Sources: Authors' calculations, see text.

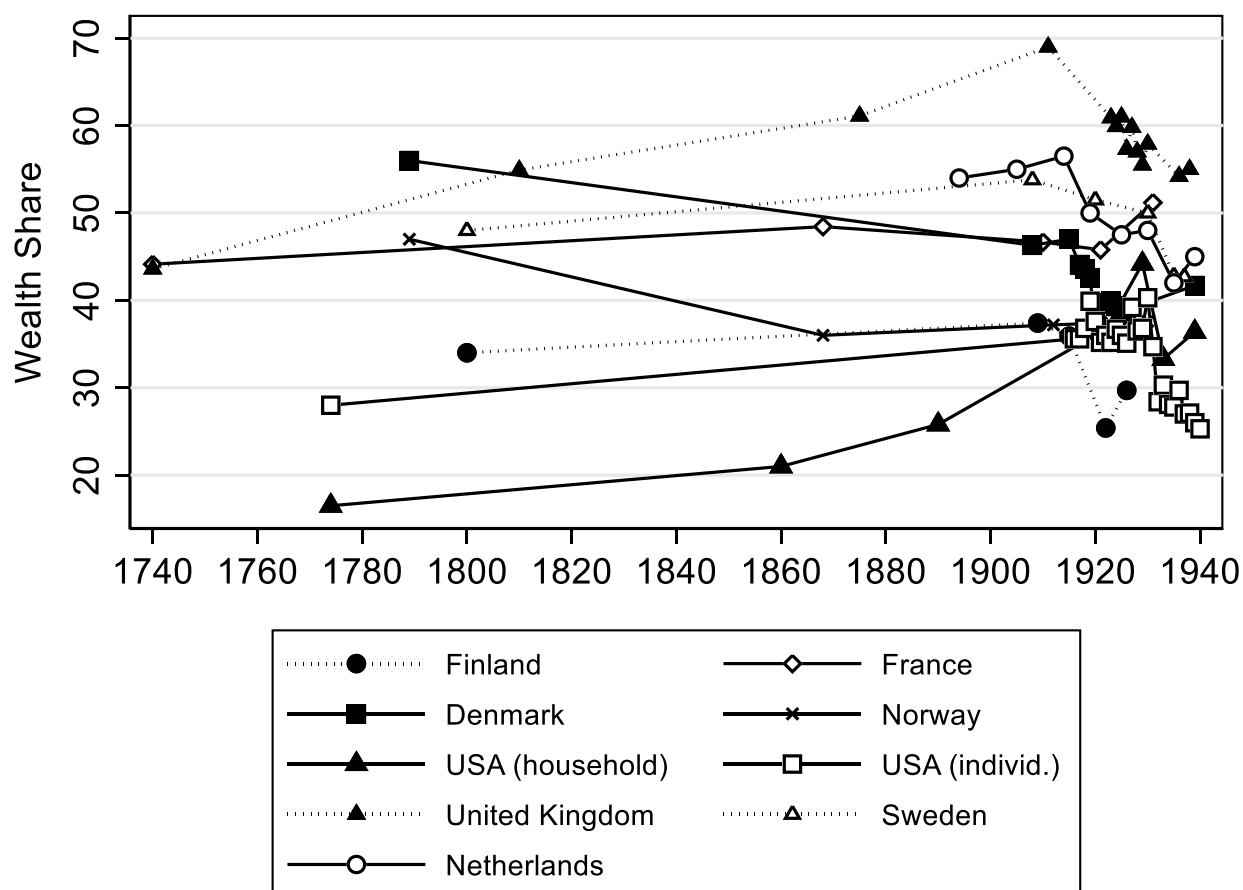


Figure C1. Top one percent's share of total private wealth, 1740–1940.

Source: Roine and Waldenström 2015; France (Garbinti et al. 2016).

¹ See, e.g., (eds.) Atkinson and Piketty 2007; (eds.) Atkinson and Piketty 2010; Milanovic 2016; Lindert and Williamson 2016. The previous studies are summarized by Lindert (2000) and

Morrison (2000). Evidence on the relationship between inequality and economic growth is controversial (see, e.g., Bertola 2000; Tuominen 2015).

² See, e.g., Riihelä et al. 2010.

³ This study also uses additional inequality measures employed by Prados de la Escosura (2008), Milanovic et al. (2011), and Milanovic (2016).

⁴ Sweden (Roine and Waldenström 2010, updated), Norway (Aaberge and Atkinson 2010; Aaberge et al. 2016), Denmark (Atkinson and Søgaard 2016), the USA (Piketty et al. 2016), Great Britain (Atkinson 2007, updated), France (Garbinti et al. 2016), Germany (Dumke 1991; Dell 2007; Bartels and Jenderny 2015).

⁵ OSF IV 1-4; Hjelt and Broms 1904; Hjelt and Broms 1905; Statistical Yearbook of Finland (SYF) 1910.

⁶ In 1904, the average incomes of the brackets are available only from rural areas.

⁷ Renvall 1900.

⁸ SYH, 1920–28.

⁹ Gylling 1906, 1907. Wages: Heikkinen 1997; Heikkinen 2017. Demographic statistics: OSF VI 1, 9, 22, 37; GDP: Hjerpe 1989; OSF 2017, Historiasarjat. Other relevant data: Vattula 1983; SYF 1879–1928, 1936.

¹⁰ See OSF IV 1, pp. 1–10; OSF IV 2, pp. 1–14; OSF IV 3, pp. 1–7; OSF IV 4, pp. 1–12; OSF VI B 1-4.

¹¹ The composition of households varied greatly (Wikström 1985, pp. 79).

¹² Heikkinen 1997, pp. 25–31. The changes in legislation of population registration: Statute book 1865, N:o 26; 1869, N:o 12; 1878, N:o 27; 1879, N:o 11.

¹³ Willgren 1932.

¹⁴ See appendix A and B for calculations and the characteristics of the data.

¹⁵ OSF IV 1, pp. 1–10; OSF IV 2, pp. 1–14; OSF IV 3, pp. 1–7; OSF IV 4, pp. 1–12. Statute book 1883, N:o 4/8.

¹⁶ See Lindert 2004, pp. 12; Hjerpe and Lefgren 1974, pp. 98–101.

¹⁷ Additionally, a taxpayer's right to deduct interest payments was more limited with municipal taxation than with state taxation for 1865–85, since interest payments were not applied to income from real property (Wikström 1985, pp. 54; Willgren 1932, pp. 240–241; Willgren 1910, pp. 393–419; OSF IV 1880, pp. 2). Nevertheless, the impact of the changes in the incomes of corporations are limited (see figure 1).

¹⁸ The stipulations on deductions from market income changed over the years. The highest income earners in particular received numerous income deductions on investments in agricultural production and incomes derived from forests (see, e.g., NAF 1917–18).

¹⁹ The incomes from the surveys were compared with the municipal taxes by Gylling (1906, 1907).

²⁰ The estimate was FIM 360 (OSF IV 4, pp. 11).

²¹ In addition, the survey provided information about the occupational status of the poorest people: those receiving the poor relief payments and pensioners were the poorest in society, but the largest group was agricultural workers (Gylling 1906, 1907). Thus, we used the year 1903 as a base year for assessing the level and the characteristics of the poorest people, and we used the living costs and wages of the workers to check the assumed average incomes (Heikkinen 1997, 2017). In addition, we made calculations using different scenarios (see appendix B).

²² In 1880, this percentage was very close as well (57.3%) (See appendix B).

²³ The Gini coefficient is a measure of statistical dispersion, and it results in values ranging from 0 to 1. Income distribution is more equal when the Gini coefficient is closer to 0, whereas it is more unequal when it is closer to 1.

$$\text{Gini coefficient} = \frac{1}{2\mu} \frac{1}{n(n-1)} \sum_{i=1}^n \sum_{j=1}^n |x_i - x_j|,$$

where μ = average

n = number of observations

$x_{i,j}$ = incomes of i and j

²⁴ This method was introduced in the World Inequality Database working paper series. Thus, we are using the name WID.

²⁵ The Gini coefficients and other inequality measures are calculated using DASP codes (Araar and Duclos 2007).

²⁶ In addition, these interpolations and extrapolations are restricted in certain ways (see Blanchet et al. 2017)

²⁷ The estimations were compared to real micro data from the U.S. (1962–2014) and France (1970–2012). The comparison was made using the following commonly utilized methods: (1) the constant Pareto coefficient; (2) log-linear interpolation; (3) the mean-split histogram; and, (4) the piecewise Pareto coefficient. They included as a starting point in their analyses only four Lorenz curve points ($p_1 = 0.1, p_2 = 0.5, p_3 = 0.9, p_4 = 0.99$). The generalized Pareto interpolation did surprisingly well at forecasting the top shares (70%, 25%, 5%): the mean percentage gap between the estimated and observed values was below 0.01% (Blanchet et al. 2017).

²⁸ Separate tabulations exist for the urban and rural areas for 1898 and 1899. However, the average incomes for the different income brackets are unknown for the urban area in 1898. They are assumed to be the same in 1898 and 1899.

²⁹ The number of income brackets increased from 7 to 16–21 between 1880 and 1904 (OSF IV 4; Hjelt and Broms 1904; Hjelt and Broms 1905).

³⁰ There is only the control estimation for 1904.

³¹ Roine and Waldenström (2015) estimated that the top one percent's share ranged from between 15 and 20 percent in 1865–1880, which is slightly lower than our results, but still the trends were equal.

³² Our estimates display similar trends, but are slightly lower than those proposed by Jäntti et al. (2006, 2010), who estimated that the top one percent's share was 15.3% and the top five percent's share 33.6% in 1920.

³³ Authors' calculations from Renvall 1900. See also Nummela 1987, pp. 248.

³⁴ Although periods occurred when income inequality increased, still the trend was towards decreasing inequality from 1920 to roughly the end of the 1980s (Jäntti et al. 2010).

³⁵ Still, many protectionist countries existed after 1880, e.g. Italy, Portugal, Spain, France, Germany, and Sweden (Leandro de la Escosura 2008).

³⁶ The difference between rural and urban incomes as well as inequalities were clear (authors' calculations). For example, the Gini coefficient for the city of Helsinki was roughly 70 points in the early 20th century (authors' calculations from SYH 1920–28).

³⁷ Authors' calculations based on tax statistics for 1898–99.

³⁸ Authors' calculations (OSF IV 1–4).

³⁹ For a history of the railroads, see Lahelma and Juuti 2009, pp. 8.

⁴⁰ No hourly data existed.

⁴¹ War victims in Finland, 1914–22: <http://vesta.narc.fi/cgi-bin/db2www/sotasurmaetusivu/stat2>.

⁴² Authors' calculations, stocks (Poutvaara 1996), cost-of-living index (Heikkinen 1997, 2017).

⁴³ The development indicated new possibilities for increasing savings. Nevertheless, roughly 35–40% were children, which meant that only 9.9% of the population had a deposit account in the saving banks. In addition, the majority of the savings were quite small (the average savings

account held FIM 850, and 61.2% of the new savings accounts had less than FIM 100 in 1912), while the deposits in private banks consisted of over FIM 600 million, which was more than double that of the saving banks. It is remarkable, however, that roughly 50% of the new deposits in savings banks in the years 1907–12 were from cottagers, laborers, or servants (SYF 1914).

⁴⁴ However, the gap increased again after the civil war (Heikkinen 2017). For more on the wages of the civil servants before WWII, see Kortteinen (1985).

⁴⁵ In addition, the state also began taxing property, gifts, and inheritance in 1918 (OSF IV 1–4; Wikström 1985, pp. 84–101; NAF 1917–18). In addition, it levied a 4% tax was collected from incomes as obligations, shares, and other interests (Statute book 1917 N:o 126).

⁴⁶ OSF IV B 1, pp. 1–11.

⁴⁷ According to Milanovic (2016), the theory of the inequality possibility frontier is supported in the very long run by findings for the following places and periods: Spain (Alvarez-Nogal and Escosura 2013); the cities of northern Italy (Alfani 2015); the Dutch Golden Age (Soltow and Van Zanden 1998); the Roman Empire from AD 14 to its collapse (Milanovic 2016, pp. 67–68).

⁴⁸ However, according to Voutilainen (2016) the famine caused a short-term increase in income inequality, which was followed by a decrease.

⁴⁹ See the calculations provided by Grant (2002).

⁵⁰ The Maddison Project Database.

⁵¹ When comparing these estimates with their modern counterparts in 2014, the results are striking when using disposable incomes as a measure. Income inequality in Finland in the nineteenth century was roughly at the same levels as in today's Mexico (0.459) or the U.S. (0.394), and it was even more unequal at the end of the nineteenth century and beginning of the twentieth century (OECD Stat 2016).

⁵² However, the inequality estimations were based on wages (see Soderberg 1991; Soderberg 1987).

⁵³ Unfortunately, the returns on the other capital incomes are unknown.

⁵⁴ Also, Piketty's *r-g* model has been criticized (see, e.g., Raval 2017).

⁵⁵ See, e.g., Piketty 2014; Soltow 1981; Harmaja 1933.

⁵⁶ The method, introduced by Blanchet et al. (2017) to create a synthesized sample, is heavily based on the boundaries of the income brackets. However, when calculating the after-tax income, the boundaries are volatile and might cause some problems for the estimations. Thus, an alternative method, introduced by Shorrocks and Wan (2008), was used to estimate the percentage difference between factor and gross income inequality. The method used to reconstruct individual income observations based on grouped distributional data involves two stages: (1) fitting a parametric Lorenz curve to the grouped data; (2) adjusting the raw data generated by the fitted function. The expected error in their synthesized Gini coefficients was below 0.1% compared with real micro data when using decile share information. The most reliable results are obtained from the log-normal function after making the stage 2 adjustment (Shorrocks and Wan 2008, pp. 22).

⁵⁷ $G_m = \frac{\frac{\mu}{s}-1}{\frac{s}{\mu}}$, where G_m = the "maximum" Gini, μ = the GDP per household, s = the subsistence minimum.

$I = \frac{G}{G_m}$, where I = the inequality extraction ratio, G = the estimated Gini, G_m = the "maximum" Gini

Acknowledgments

Funding from the Strategic Research Council (SRC) at the Academy of Finland (No. 293120), Work, Inequality, and Public Policy (WIP), is gratefully acknowledged. Special thanks go to Teppo Lindfors for his help with data collection. We are grateful to the following people for their comments and suggestions: the participants of the Graduate Seminar in Economic History (London School of Economics 2018), Leandro Prados de la Escosura (Groningen summer school 2016), Peter Lindert (Shocks and Reconstructions: Histories of Long-Term Inequalities, Tampere 2016), Jaime Reis (the 11th Sound Economic History Workshop, Helsinki 2016), Antti Häkkinen (Economic History Seminars, Helsinki), Ilpo Suoniemi, Matti Tuomala, and Marja Riihelä (WIP Workshops 2016-18). In addition, we are grateful for the detailed comments provided by Riitta Hjerppe, Markus Jäntti, Sakari Saaritsa, Ilkka Nummela, and Terhi Ravaska. Finally, we are thankful for very useful comments by three anonymous referees.

Conflict of interest statement. None declared.

Sources

- GYLLING, E. (1906). Väestö-, invaliditeetti- ja tulosuhteet Tuusulan, Humppilan, Kymin, Räisälän ja Vihannin kunnissa vuonna 1903: tilastollinen tutkimus. 1. *Invaliditeettivakuutuskomitean julkaisu 2*. Helsinki.
- GYLLING, E. (1907). Väestö-, invaliditeetti- ja tulosuhteet Tuusulan, Humppilan, Kymin, Räisälän ja Vihannin kunnissa vuonna 1903: tilastollinen tutkimus. 2, Taululiitteitä. *Invaliditeettivakuutuskomitean julkaisu 3*. Helsinki.
- HJELT, A. and BROMS, O. A. (1904). *Kunnallinen tuloverotus ja tulosuhteet Suomessa, I. Kaupungit*. Helsinki.
- HJELT, A. and BROMS, O. A. (1905). *Kunnallinen tuloverotus ja tulosuhteet Suomessa, II. Maalaiskunnat*. Helsinki.
- THE NATIONAL ARCHIVES OF FINLAND (1917–18). *Suostuntaveron kantokirjat (1916)*. Lääninhallitus. Läänien revidoitujen tilien arkisto.
- OECD Stat 2016. *Income Distribution and Poverty*. <http://stats.oecd.org/>. Data extracted on 14 Oct 2016 14:25 UTC (GMT).
- Official Statistics of Finland (OSF). Publications are available in Finnish and Swedish with headlines often also in French. IV:1 (1869). Varallisuuden suhteita 1. Kertomus Suomenmaan suostuntaverosta vuonna 1865. *Statistics of Property IV 1*. Helsinki: Tilastollinen toimisto.
- OSF IV:2 (1875). Varallisuuden suhteita 2. Kertomus Suomenmaan suostuntaverosta vuonna 1871. *Statistics of Property IV 2*. Helsinki: Tilastollinen toimisto.

- OSF IV:3 (1880). Varallisuuden suhteita 3. Kertomus Suomenmaan suostuntaverosta vuonna 1877. *Statistics of Property IV 3*. Helsinki: Tilastollinen toimisto.
- OSF IV:4 (1885). Varallisuuden suhteita 4. Kertomus Suomenmaan suostuntaverosta vuonna 1881. *Statistics of Property IV 4*. Helsinki: Tilastollinen päätoimisto.
- OSF VI:1 (1870). Suomen väestö joulukuun 31 pp. 1865. *Population Statistics VI 1*. Helsinki: Tilastollinen toimisto.
- OSF VI:9 (1882). Suomen väestö joulukuun 31 pp. 1880. *Population Statistics VI 9*. Helsinki: Tilastollinen toimisto.
- OSF VI:22 (1894). Suomen väestö 31:nä p:nä joulukuuta 1890. *Population Statistics VI 22*. Helsinki: Tilastollinen päätoimisto.
- OSF VI:37 (1905). Katsaus Suomen väkilukuun joulukuun 31 päivänä 1900. *Population Statistics VI 37*. Helsinki: Tilastollinen päätoimisto.
- OSF XVIII A:30–35 (1915–35). Teollisuustilastoa, 1913–34. *Statistics of Industry and Buildings XVIII A 30-51*. Helsinki: Teollisuushallitus / Tilastollinen päätoimisto.
- OSF IVB:1 (1926). Tulo- ja omaisuusverotilastoa, 1920–21. *Statistics of Property IV B 1*. Helsinki: Tilastollinen päätoimisto.
- OSF IVB:2 (1926). Tulo- ja omaisuusverotilastoa, 1922. *Statistics of Property IV B 2*. Helsinki: Tilastollinen päätoimisto.
- OSF IVB:3 (1926). Tulo- ja omaisuusverotilastoa, 1924. *Statistics of Property IV B 3*. Helsinki: Tilastollinen päätoimisto.
- OSF IVB:4 (1930). Tulo- ja omaisuusverotilastoa, 1926. *Statistics of Property IV B 4*. Helsinki: Tilastollinen päätoimisto.

- OSF (2017). *Historiasarjat: Kansantalouden tilinpito 1860–2015*. Statistics Finland's PX-Web databases: Historical time series: National accounts 1860-2015. Retrieved 28.04.2017.
- STATISTICAL YEARBOOK OF FINLAND, 1879–1938.
- STATISTICAL YEARBOOK OF HELSINKI, 1920–28.
- STATUTE BOOK OF FINLAND, 1865, 1869, 1878, 1879, 1883, 1889, 1898, 1915, 1916, 1917, 1920, 1927, 1931.
- RENVALL, H. (1900). Tulojenjaosta Suomen suurimmissa kaupungeissa 1875–1899. *Kansantaloudellisen yhdistyksen esitelmiä. Sarja III*.
- THE WORLD INEQUALITY DATABASE (WID) (2018). Downloaded from wid.world on 29-05-2018 at 07:19:30. DOI: <http://wid.world/data/>.
- THE MADDISON-PROJECT. <http://www.ggdcc.net/maddison/maddison-project/home.htm>, 2013 version.
- VATTULA, K. (eds.) (1983). *The Economic History of Finland 3. Historical Statistics*. Helsinki.

References

- AABERGE, R., ATKINSON, A. B. and MODALSLI, J. (2016). On the Measurement of Long-run Income Inequality: Empirical Evidence from Norway, 1875–2013. *Statistics Norway, Research Department, Discussion Papers* **847**, pp. 1–68.
- AABERGE, R. and ATKINSON, A. B. (2010). Top Incomes in Norway. In Atkinson, A. B. and Piketty, T. (eds.) *Top Incomes: A Global Perspective*. Oxford University Press, pp. 448–481.

- ALFANI, G. (2015). Economic Inequality in Northwestern Italy: A Long-Term View (Fourteenth to Eighteenth Centuries). *The Journal of Economic History* **75** (4), pp. 1058-1096. doi:10.1017/S0022050715001539.
- ALVAREZ-NOGAL, C. and PRADOS DE LA ESCOSURA, L. (2013). The Rise and Fall of Spain (1270–1850). *Economic History Review* **66** (1), pp. 1–37.
- ARAAR, A. and DUCLOS, J.-Y. (2007). *DASP: Distributive Analysis Stata Package*. PEP, World Bank, UNDP and Université Laval.
- AROLA, M. (2006). Foreign capital and Finland. Central government's first period of reliance on international financial markets, 1862-1938. *State Treasury, Scientific monographs* **E37**.
- ATKINSON, A. B. (2007). The Distribution of Top Incomes in the United Kingdom 1908-2000. In Atkinson, A. B. and Piketty, T. (eds.) *Top Incomes over the Twentieth Century. A Contrast Between Continental European and English-Speaking Countries*. Oxford University Press, pp. 82–140.
- ATKINSON, A. B. and PIKETTY, T. (eds.) (2007). *Top incomes over the twentieth century: a contrast between continental European and English-speaking countries*. Oxford University Press.
- ATKINSON, A. B. and PIKETTY, T. (eds.) (2010). *Top incomes: A global perspective*. Oxford University Press.
- ATKINSON, A. B. and SØGAARD, J. E. (2016). The Long-Run History of Income Inequality in Denmark. *The Scandinavian Journal of Economics* **118** (2), pp. 264–291. DOI: 10.1111/sjoe.12143.

- ATKINSON, A. B., PIKETTY, T. and SAEZ, E. (2010). Top Incomes in the Long Run of History. In Atkinson, A. B. and Piketty, T. (eds.), *Top incomes: A global perspective*. Oxford University Press, pp. 664–760.
- AUTIO, J. (1996). Korot Suomessa 1862–1952. *Bank of Finland Discussion Papers* 7, pp. 1–55. Helsinki.
- BARTELS, C. and JENDERNY, K. (2015). The Role of Capital Income for Top Income Shares in Germany. *WTID Working Paper* 1, pp. 1–56.
- BENGTTSSON, E. and WALDENSTRÖM, D. (2017). Capital shares and income inequality: Evidence from the long run. *IZA Discussion Papers*, pp. 1–55. March 2017, updated 2.0.
- BERTOLA, G. (2000). Macroeconomics of Distribution and Growth. In Atkinson, A. B. and Bourguignon, F. (eds.), *Handbook of Income Distribution. Vol 1*, pp. 477–540. Amsterdam: North-Holland.
- BLANCHET, T., FOURNIER, J. and PIKETTY, T. (2017). Generalized Pareto Curves: Theory and Applications. *Wid.world Working Paper Series* 3, pp. 1–17.
- BRANDOLINI, A. and VECCHI, G. (2011). The Well-Being of Italians: A Comparative Historical Approach. *Economic History Working Papers* 19. Rome: Banca d'Italia.
- DELL, F. (2007). Top Incomes in Germany Throughout the Twentieth Century 1891–1998. In Atkinson, A. B. and Piketty, T. (eds.) *Top Incomes over the Twentieth Century. A Contrast Between Continental European and English-Speaking Countries*. Oxford University Press, pp. 365–425.

- DUMKE, R. (1991). Income inequality and industrialization in Germany 1850–1913: the Kuznets hypothesis re-examined. In Brenner, Y., Kaelble, H. and Thomas, M. (eds.) *Income distribution in historical perspective*. Cambridge. pp. 117–148.
- FOUGSTEDT, G. (1948). Inkomstens fördelning i Finland. *Ekonomiska Samfundets tidskrift* 1 (4), pp. 248–273. Helsinki.
- GARBINTI, B., GOUPILLE-LEBRET, J. and PIKETTY T. (2016). Accounting for Wealth Inequality Dynamics: Methods, Estimates and Simulations for France (1800–2014). *Wid.world Working Paper Series* 5, pp. 1–69. URL: <http://cepr.org/sites/default/files/Goupille-Lebret%2C%20Jonathan.pdf>.
- GRANT, O. W. (2002). Does Industrialisation Push Up Inequality? New Evidence on The Kuznets curve from Nineteenth-Century Prussian Tax Statistics. *Discussion Papers in Economic and Social History* 48. Oxford: University of Oxford.
- HARMAJA, L. (1933). Effects of the War on economic and social life in Finland. New Haven.
- HARVIA, Y. (1919). *Kunnallisverotuksen uudistuksen suuntaviivoja*. Yhteiskuntataloudellisia kirjoituksia 16. Kansantaloudellisen Yhdistyksen esitelmä. Helsinki
- HIPPEL, P., SCARPINO, S. and HOLAS, I. (2016). Robust Estimation of Inequality from Binned Incomes. *Sociological Methodology*, 46 (1), pp. 1–42. Published online 2015. DOI: 10.1177/0081175015599807.
- HEIKKINEN, S. and HJERPPE, R. (1987). The Growth of Finnish Industry in 1860–1913. Causes and Linkages. *The Journal of European Economic History* 2, pp. 227–244.
- HEIKKINEN, S. (1997). *Labour and the Market. Workers, Wages and Living Standards in Finland, 1850–1913*. Helsinki.

- HEIKKINEN, S. (2017). War, Inflation, and Wages: The Labor Market in Finland, 1910–1925. *The Journal of the Economic & Business History Society* 35 (1), pp. 62–107.
- HJERPPE, R. and LEFGREN, J. (1974). Suomen tulonjakautuman kehityksestä 1881–1967. *The Finnish Economic Journal* 2, pp. 97–119.
- HJERPPE, R. (1988). Suomen talous 1860–1985: Kasvu ja rakennemuutos. *Bank of Finland Publications, Studies on Finland's Economic Growth XIII*. pp. 314. Helsinki.
- HJERPPE, R. (1989). The Finnish Economy 1860–1985. Growth and Structural Change. *Bank of Finland Publications, Studies on Finland's Economic Growth XIII*. Helsinki.
- HÄKKINEN, A. and PELTOLA, J. (2005). Suomalaisen “alaluokan” historiaa: Köyhyys ja työttömyys Suomessa 1860–2000. In Häkkinen, A. et al. (eds.) *Vieraat kulkijat – tutut talot: Näkökulmia etnisyyden ja köyhyyden historiaan Suomessa*, pp. 39–94. Historiallinen arkisto 120, Helsinki: SKS.
- JÄNTTI, M. (2006). Income Distribution in the 20th Century. In Ojala, J. et al. (eds.) *The Road to Prosperity: an Economic History of Finland*, pp. 245–260. Helsinki: SKS.
- JÄNTTI, M., RIIHELÄ, M., SULLSTRÖM R. and TUOMALA M. (2010). Trends in Top Incomes Shares in Finland. In Atkinson, A. B. and Piketty T. (eds.): *Top incomes: A global perspective*, pp. 371–447. Oxford: Oxford University Press.
- KEKKONEN, J. (1987). Merkantilismista liberalismiin: Oikeushistoriallinen tutkimus elinkeinovapauden syntytaustasta Suomessa vuosina 1855–1879. Helsinki: Suomalainen Lakimiesyhdistys.
- KORTTEINEN, T. (1985). The Social Class of Finnish Civil Servants before World War II. *Acta Sociologica* 28 (3), pp. 227–241.

- KUZNETS, S. (1955) Economic growth and income inequality. *The American Economic Review* **45** (1), pp. 1–28. URL: <http://www.jstor.org/stable/1811581>.
- LAHELMA, H. and JUUTI, V. (2009). *Finnish Railway Statistics 2009*. Helsinki: Finnish Rail Administration.
- LINDERT, P. H. (2004). *Growing Public, Volume 1: Social Spending and Economic Growth since the Eighteenth Century*. Cambridge University Press.
- LINDERT, P. H. (2000). Three Centuries of Inequality in Britain and America. In Atkinson A. B. and Bourguignon, F. (eds.) *Handbook of Income Distribution. Vol 1*, pp. 167–216. Amsterdam: North-Holland.
- LINDERT, P. H. & WILLIAMSON, J. G. (2016) *Unequal Gains: American Growth and Inequality since 1700*. Princeton: Princeton University Press.
- LILIUS, A (1888). *Tutkimuksia taloudellisista oloista Suomen maaseudulla. Kolmas vihko*. Helsinki: SKS.
- MARKKANEN, E. (1977). *Maaseutuväestön varallisuusolot ja luottosuhteet sisä-Suomessa elinkeinoelämän murroskaudella v. 1850–1914*. Jyväskylä.
- MILANOVIC, B. (2016). *Global Inequality: A New Approach for the Age of Globalization*. Cambridge: The Belknap Press of Harvard University Press. ISBN 9780674737136.
- MILANOVIC, B., LINDERT, P. and WILLIAMSON, J. (2011). Pre-Industrial Inequality. *The Economic Journal* **121**, pp. 255–272. Doi: 10.1111/j.1468-0297.2010.02403.x.
- MORRISON, C. (2000). Historical perspectives on income distribution: the case of Europe. In Atkinson, A. B. and Bourguignon, F. (eds.) *Handbook of Income Distribution, vol. 1*, pp. 217–260. Amsterdam: North-Holland.

- NUMMELA, I. and LAITINEN E. K. (1987). Distribution of Income in Kuopio 1880–1910. *Scandinavian Economic History Review* **35** (3), pp. 237–253. Jyväskylä. DOI: 10.1080/03585522.1987.10408098.
- NUMMELA, I. (1990). Torpparista viis’, itsellisestä kaks’... Taloudellinen eriarvoisuus Suomen maaseudulla vuosisadan vaihteessa. In Ahonen, Kalevi (eds.) *Sitä kuusta kuuleminen: Jorma Ahvenaiselle omistettu juhlakirja*. Jyväskylä. pp. 201–234.
- NYBERG P. and VAIHEKOSKI M. (2009). A new value-weighted total return index for the Finnish stock market. *Bank of Finland Research Discussion Papers* **21**.
- PELTONEN, M. (1992). Talolliset ja torpparit: Vuosisadan vaihteen maatalouskysymys Suomessa. *Suomen Historiallinen Seura, Historiallisia tutkimuksia* **164**. Helsinki.
- PIKETTY, T. (2015). Putting Distribution Back at the Center of Economics. Reflections on ‘Capital in the Twenty-First Century’. *The Journal of Economic Perspectives* **29**, pp. 67–88.
- PIKETTY, T. (2014). *Capital in the Twenty-First Century*. Cambridge.
- PIKETTY, T. (2003). Income inequality in France, 1900–1998. *Journal of Political Economy* **111** (5), pp. 1004–1042.
- PIKETTY, T. (2001). *Les hauts revenus en France au 20ème siècle*. Paris: Grasset.
- PIKETTY, T. and SAEZ, E. (2003). Income inequality in the United States, 1913–1998. *Quarterly Journal of Economics* **118** (1), pp. 1–39.
- PIKETTY, T. and SAEZ E. (2006). The Evolution of Top Incomes: A Historical and International Perspective. *American Economic Review* **96** (2), pp. 200–205. DOI: 10.1257/000282806777212116.

- PIKETTY, T., SAEZ, E. and ZUCMAN, G. (2016). Distributional National Accounts: Methods and Estimates for the United States. *WID.world Working Paper Series 4*. URL: <http://wid.world/document/t-piketty-e-saez-g-zucman-data-appendix-to-distributional-national-accounts-methods-and-estimates-for-the-united-states-2016/>.
- POUTVAARA, P. (1996). Pörssikurssien kehitys Suomessa 1896–1929. *Bank of Finland Discussion Papers 25*. Helsinki: Suomen Pankin monistuskeskus.
- PRADOS DE LA ESCOSURA, L. (2008). Inequality, poverty and the Kuznets curve in Spain, 1850–2000. *European Review of Economic History* **12**, pp. 287–324.
DOI:10.1017/S1361491608002311.
- RASILA, V. (1970). *Torpparikysymyksen ratkaisuvaihe. Suomen torpparikysymys vuosina 1909–1918*. SKS:n Toimituksia 914:2. Helsinki: Kirjayhtymä.
- RAVAL, D. (2017). What’s Wrong with Capital in the Twenty-First Century’s Model? In Boushey, H. et al. (eds.) *After Piketty. The Agenda for Economic and Inequality*. Cambridge and London: Harvard University Press, pp. 75–98.
- RIIHELÄ, M., SULLSTRÖM, R. AND TUOMALA, M. (2010). Trends in Top Income Shares in Finland 1966–2007. *Government Institute for Economic Research, Research Reports 157*.
- ROINE, J. and WALDENSTRÖM, D. (2015). Long-Run Trends in the Distribution of Income and Wealth. In Atkinson, A. B. and Bourguignon, F. (eds.) *Handbook of Income Distribution, Volume 2A*, pp. 469–592.
- ROINE, J. and WALDENSTRÖM, D. (2008). The evolution of top incomes in an egalitarian society: Sweden, 1903–2004. *Journal of Public Economics* **92**, pp. 366–387.

- ROINE, J. and WALDENSTRÖM, D. (2010). Top Incomes in Sweden over the Twentieth Century. In Atkinson, A. B. and Piketty, T. (eds.) *Top Incomes: A Global Perspective*. Oxford University, pp. 303–373.
- RYCKBOSCH, W. (2015). Economic inequality and growth before the industrial revolution: the case of the Low Countries (fourteenth to nineteenth centuries). *European Review of Economic History* **20** (1), pp. 1–22.
- SAARITSA, S. (2008). *Beneath Moral Economy. Informal Assistance in Early 20th Century Finland*. Firenze: European University Institute, pp. 350.
- SCHEIDEL, W. (2017). *The Great Leveler. Violence and the History of Inequality from the Stone Age to the Twenty-First Century*. Princeton and Oxford: Princeton University Press.
- SHORROCKS, A. and WAN, G. (2008). Ungrouping Income Distributions. Synthesising Samples for Inequality and Poverty Analysis. Unu-Wider, Research Paper **16**.
- SODERBERG, J. (1887). Trends in inequality in Sweden 1700–1914. *Historical Social Research* **21**, pp. 58–78.
- SODERBERG, J. (1991). Wage differentials in Sweden, 1725–1950. In Brenner, Y. et al. (eds.), pp. 76–95.
- SOININEN, A. M. (1981). Maatalousväen palkkakehitys 1800-luvun lopussa ja 1900-luvun alussa. Ajanjakso 1878–1913. University of Helsinki, Institute of Economic and Social History, Communications **11**.
- SOLTOW, L. and VAN ZANDEN, J. L. (1998). *Income and Wealth Inequality in the Netherlands 16th-20th Century*. Amsterdam: Het Spinhuis.

- SOLTOW, L. (1981). Wealth Distribution in Finland in 1800. *Scandinavian Economic History Review* **29** (1), pp. 21–32. DOI: 10.1080/03585522.1981.10407936.
- TUOMINEN, E. (2015) *Essays on Income Distribution and Economic Growth*. University of Tampere, Acta Universitatis Tamperensis 2119, Academic Dissertation.
- VOUTILAINEN, M. (2016). Poverty, Inequality and the Finnish 1860s Famine. *Jyväskylä Studies in Humanities* **287**. Jyväskylä: University Library of Jyväskylä.
- WIKSTRÖM, K. (1985). *Valtion tuloveron rakenne. Tutkimus tuloveron rakenteesta ja sen peruspiirteiden historiallisesta kehityksestä*. University of Turku publications, series C. Turku.
- WILLGREN, K. (1910). *Suomen finanssioikeus*. Porvoo.
- WILLGREN, K. (1932). *Finlands finansrätt*. Helsinki: Söderström.

Appendix

A. The Main Characteristics of the Data

Table A1. (Here)

Table A2. (Here)

B. Evaluating the Income Data

B1. Taxable vs. “Actual” Incomes?

One critical question concerning income tax statistics for studying economic inequality is as follows: Can we assume that taxed income tallies with the “actual” incomes? The limited coverage of the state income tax records for 1865–85 poses another problem. In the following paragraphs, we consider the possible problems with respect to the tax data.

The tax boards could only provide an estimate of incomes in the nineteenth and early twentieth centuries because of the fact that it was voluntary to file an income tax return until 1915.ⁱ Estimated incomes were based on, among other things, information about taxpayers’ notifications, lands, and property, their labor income, and income from the previous year.ⁱⁱ Thus, assessing people’s incomes was a laborious process, which might well have affected the overall reliability.ⁱⁱⁱ In 1865, roughly 26% of taxpayers reported their incomes, but subsequently the number dropped to only a few percentage points until 1880.^{iv} Hence, the absence of a notification requirement was one of the most problematic issues when assessing incomes on the basis of income taxes from 1865 to 1904.^v

Since Finland was to a great extent still an agricultural economy during the research period, the correct estimation of agricultural incomes is crucial for the reliability of income data.^{vi} The incomes from agrarian production were difficult to assess. On the other hand, the early state income tax (1865–85) was disproportionately levied on urban households. As a result, besides the problem of assessing how well taxed agricultural income corresponds with actual income, measuring non-taxed agricultural income was also a problem.

A further problem is that the reliability of the income estimates in the tax rolls varied depending on social classes (Table B1).^{vii} Voluntary notification protocol historically resulted in considerably lower reported incomes in the highest income brackets.^{viii} On the other hand, high officials at the time accused low-income earners and crofters of avoiding taxes.^{ix} In addition, the incomes of public-sector officials, laborers, and general employees were more reliable compared to those of entrepreneurs.^x Estimates of the incomes of companies were based on several factors: sales, the number of employees, wage payments, and capital.^{xi} Entrepreneurs needed to have an account, but it was only used if tax payers complained about the amount they were being taxed.^{xii}

Table B1. Here

Finally, some people may have been untaxed for political reasons before 1906: voting rights were connected with tax payments, which may have meant that the lowest income earners were omitted from the tax registers, especially in Helsinki. Such a suspicion was due to the language battle between Swedish and Finnish speakers.^{xiii}

Despite these problems, the Finnish tax data from the years 1865–1926 appears as relatively reliable data for the purposes of our study. First, the tax boards consisted of five

to nine persons per municipality, and every social group had a representative on these tax boards.^{xiv} Second, the tax assessments were public information, and it was possible to check the taxes paid by one's neighbors.^{xv} Third, it was possible to appeal to a county-level committee.^{xvi} Fourth, in the assembly of the representatives of the estates the eligibility to vote and the number of votes were determined partially by the taxes paid.^{xvii} Fifth, there were only minor incentives to avoid taxes because of the relatively low tax rate.^{xviii}

Nevertheless, it is obvious that the assessed incomes were largely underestimated.^{xix} According to a survey of five rural communities from 1903, taxed incomes were approximately 75–80% of the actual gross incomes. In addition, the incomes of the poorest people were greatly overestimated (which goes against our overall assumption), whereas the incomes of the richest (those earning over FIM 6 000) were underestimated. Still, for the other income brackets incomes mainly ranged between 73% and 88% of actual incomes. However, the different income concepts and units in place at the time might offer a partial explanation for why the income levels assessed in the survey differed from the income tax records.^{xx} In addition, it is noticeable that the closer the boundary for the higher marginal tax, the higher the average income for those in that particular tax bracket in 1880. This indicates moderate tax evasion: it is possible that the tax recipients tried to keep their incomes below the threshold. However, this type of bias was absent in later years.

Most of the critical reliable issues pertained to early state income tax statistics (1865, 1871, 1876, and 1880), since they included only between 18.8% and 31.2% of all households (see appendix A). In gauging the general credibility of the tax data, we compared the sum of taxed income with GDP.^{xxi} Figure B1 plots the collected income taxes against the nominal

GDP natural logarithms for 1865–80. Since the tax rate was rather low (0.8–1.2%), the share of taxed households was small (see appendix A above) and the ratio of collected income taxes to GDP was notably low, below 0.2% on average for 1865–85. Hence, we had expected the tax sum to fluctuate greatly in relation to the GDP. This was not the case. Instead, we noticed a strong correlation between changes in GDP and changes in the income taxes collected ($R^2=0.764$, statistically significant at a level of 0.1%).

Figure B1. (Here)

Although the level of correspondence between the income tax sum and GDP was very good (the tax sum increased when GDP grew and decreased when GDP declined), two major exceptions appeared to this rule in 1868 and 1878. The first of these years relates to the great famine of 1867–68, when mortality was high and incomes were declining, especially in the winter of 1867–68 and the spring of 1868. The rise in nominal GDP in 1868 reflects the ameliorating economic situation of the second half of the year. In 1878, again, the sum of collected taxes remained the same, even though nominal GDP declined. One possible explanation for this is that the nominal incomes of the urban population, which accounted for 52–59% of the total sum, developed more favorably than the incomes of the rural population, whereas much of the GDP came from the agricultural sector. Furthermore, the rising number of taxed persons partly compensated for the decline in incomes: the number of tax units rose by 12.2% from 1876 to 1880, while the per person taxation declined by 3.2%. Although the correspondence between changes in the tax sum and GDP is not perfect, our data points (1865, 1871, 1876, and 1880) lie comfortably close to the regression line, causing

us to believe that, on average, tax data is a reliable source for studying the level of income inequality in the years 1865–85.

Figure B2 compares the changes in the ratio of the nominal GDP per household to the lowest tax boundary with a share of the taxed population. We notice that both rose during the latter part of the 19th century. During the years 1922–24, the nominal GDP per household relative to the lowest tax threshold decreased, however, significantly more compared with the share of the taxed population. This incongruence could have been caused by high inflation, shocks to the top income earners, and changes in the taxation and deduction system.

Figure B2. (Here)

In short, though, our comparisons of the sum of collected taxes and GDP as well as the ratios of the nominal GDP per household and the lowest tax boundary strongly support the use of income tax statistics as a source.

B2. Estimated Gini coefficients compared with control series

In figure B2, we have estimated three different alternative series for Gini coefficients. First, min = non-taxed average incomes, which were set at 90% of the lowest tax boundary, max = non-taxed average incomes, which were set at 50% of the lowest tax boundary. Second, we assumed that the total household incomes in the years 1865–76 were the same percentage of GDP as in 1880. Third, the first p coordinate (percentage of non-taxed households) of the Lorenz curve ranges between 0.2 and 0.8, depending on the year. Thus, we devalued the “better” data (removed several data points) from 1898–99 so that it more closely matched

that from 1880. We can conclude that the overall picture remained unchanged, despite the major changes in our assumptions.

Figure B3. (Here)

C. The Gini Coefficients, the Top Income Shares (%), and the Top Wealth Shares.

Table C1. (Here)

Figure C1. (Here)

ⁱ OSF IV 1, pp. 1–10; OSF IV 2, pp. 1–14; OSF IV 3, pp. 1–7; OSF IV 4, pp. 1–11; NAF 1916; SYF 1936, pp. 8; Vattula 1983, pp. 47–49; Wikström 1985; Harvia 1919. In the late nineteenth century and at the beginning of the twentieth century, income taxation moved to a more integrated tax return in rural areas (Wikström 1985, pp. 52–60).

ⁱⁱ OSF IV 4, pp. 1–12.

ⁱⁱⁱ Nummela 1990, pp. 209.

^{iv} In addition, the practices for measuring incomes varied between provinces (OSF IV 4, pp. 1–12).

^v Only public-sector officials were obliged to notify the state of their income (Wikström 1985, pp. 33–49). Households did not have to prepare an account book as a record of their income, which caused inaccuracies in the taxable incomes, especially in rural areas (Harvia 1919, pp. 12).

^{vi} Nummela 1990, pp. 204; Wikström 1985, pp. 49; Harvia 1919, pp. 13; OSF 3, pp. 6; OSF IV 4, pp. 1–12.

^{vii} Wikström 1985, pp. 19–21; Harvia 1919, pp. 13–29; OSF IV 4, pp. 11.

^{viii} See, e.g., Wikström 1985, pp. 86; Soltow 1981.

^{ix} Hjelt and Broms 1905.

^x Wikström 1985, pp. 19–21; Harvia 1919, pp. 13–29; OSF IV 4, pp. 11.

^{xi} Harvia 1919, pp. 29.

^{xii} Wikström 1985, pp. 19–21.

^{xiii} Nummela 1990, pp. 209; Nummela and Laitinen 1987.

^{xiv} Wikström 1985, pp. 23.

^{xv} Statute book 1898 N:o 21: 83§ 84§. Statute book 1898 N:o 26. NAF 1917–18.

^{xvi} Wikström 1985, pp. 23.

^{xvii} Statute book 1898 N:o 21: 83§ 84§. Hjelt and Broms 1904, pp. 1–11; Hjelt and Broms 1905, pp. 1–5.

^{xviii} OSF IV 1–4; Hjelt and Broms 1904, 1905; OSF IV B 1–4; NAF 1916; Harvia 1919; Wikström 1985.

^{xix} Hjerppe 1988, pp. 30.

^{xx} Author's calculations from Gylling 1907, pp. 147–148.

^{xxi} Income taxes were not used as a source when constructing the GDP series (Hjerppe 1988, pp. 30).